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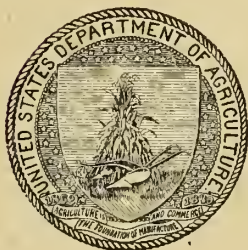
OFFICE OF EXPERIMENT STATIONS—BULLETIN 252.

A. C. TRUE, Director.

SOME TYPES OF CHILDREN'S
GARDEN WORK.

BY

Miss SUSAN B. SIPE,

*Collaborator, Bureau of Plant Industry
and Office of Experiment
Stations.*WASHINGTON:
GOVERNMENT PRINTING OFFICE.

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THE OFFICE OF EXPERIMENT STATIONS.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., June 3, 1912.

SIR: I have the honor to transmit herewith a report on some phases of elementary instruction in agriculture by Miss Susan B. Sipe. The investigations upon which this report is based were made in the larger cities from Pittsburgh, Pa., to the Pacific coast, under a joint letter of instructions from the chief of the Bureau of Plant Industry and the director of this office. Miss Sipe found and has described some important phases of children's garden work not described in previous reports, and I therefore recommend the publication of this report as Bulletin No. 252 of the Office of Experiment Stations.

Respectfully,

A. C. TRUE,
Director.

HON. JAMES WILSON,
Secretary of Agriculture.

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SOME TYPES OF CHILDREN'S GARDEN WORK.

INTRODUCTION.

School garden work has become so general within the past five years and literature relative to the same so abundant that facts of the nature furnished in earlier reports would be superfluous, viz, what to plant, the distances apart of the rows and of the seeds in the row, and like detailed information. Teachers need now to view the garden from a higher plane—its relation to daily living, its effect upon character development, its place in the curriculum, and its relation to other subjects in the course of study. Therefore, in making this report such facts have taken a more prominent place than the ones that may be obtained from textbooks.

The individual plot system and the young gardener, owner of all he raises, is the system in vogue east of the Rockies. West of the Rockies almost invariably the commercial side holds a place of importance equal with the cultivation, but the products are sold for the benefit of the school. Children are taught business methods through the sale. The system of teaching agriculture used is always based on the best local practice and is one that children can follow intelligently, but the products are always the property of the school.

Nowhere is there systematized garden instruction in the city graded schools. In a majority of places it is still a matter of choice with the principals. Until the necessity of a specialized instructor is felt the work will not be systematized. The educational value of garden instruction is too great to allow it to be a matter of choice with teachers. There seems to be a fear among educators in official positions of burdening teachers and the course of study with new subjects.

As our modes of living improve the demand comes to the schools for practical methods dealing with the question of right living. It is safe to predict that popular demand will cause the replacement of some of our antiquated methods and subjects by systematized science lessons that will teach people how to lead more wholesome and useful lives.

CHILDREN'S GARDEN WORK.

PITTSBURGH.

The Pittsburgh Playground Association directs the agricultural education of the children of that city. Wherever the principals of schools will cooperate the association is ready to lend assistance. Nine vacation schools, in which nature study and gardening were an important part of the course, were conducted during the summer of 1911. Besides these, children between 9 and 15 years were taught woodwork, basketry, sewing, cooking, drawing, physical training, folk dances, gymnastics, dramatics, and games. The total attendance in the gardening and nature study classes for 1910 was 32,733, at a cost per capita of \$0.093. (Pl. I.)

The nine gardens that are connected with the vacation schools are all similarly planned. The plats are 6 feet by 12 feet, the rows running lengthwise, and the 13 rows in each plat are planted as shown in the following plan. (Fig. 1.)

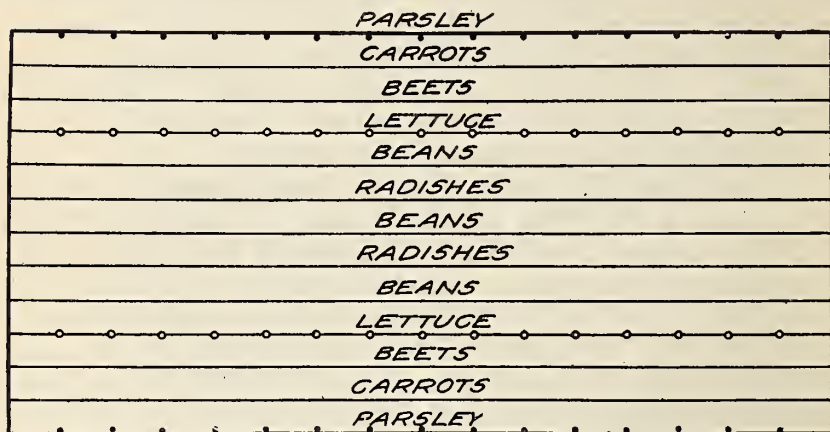


Fig. 1.—Planting plan of vacation school gardens, Pittsburgh.

The planting is very close, the rows being but 6 inches apart, but after the radishes are harvested the rows of beans stand a foot apart. Very careful supervision prevents injury during cultivation. Such supervision is possible, as there are no stated class hours, the children coming when it is most convenient for them. It was feared that stated hours would prevent many children from attending, so the teachers are employed eight hours a day during the summer. The morning hours are always given to the garden, and more time if necessary to meet the children individually. The rest of the day is spent in visiting home gardens.

The gardens with but one exception are on land owned by private parties. They are widely scattered over the city, and—

It is aimed eventually to reach every district with a combined garden and playground. It is hoped for each garden that it may be a center of knowledge,



FIG. 1.—McCANN GARDEN, PITTSBURGH, PA.



FIG. 2.—NATURE-STUDY CLASS CONDUCTED BY THE PITTSBURGH PLAYGROUND ASSOCIATION.



FIG. 1.—CHICKEN RANCH AT THE TRACE GARDEN, PITTSBURGH, PA.

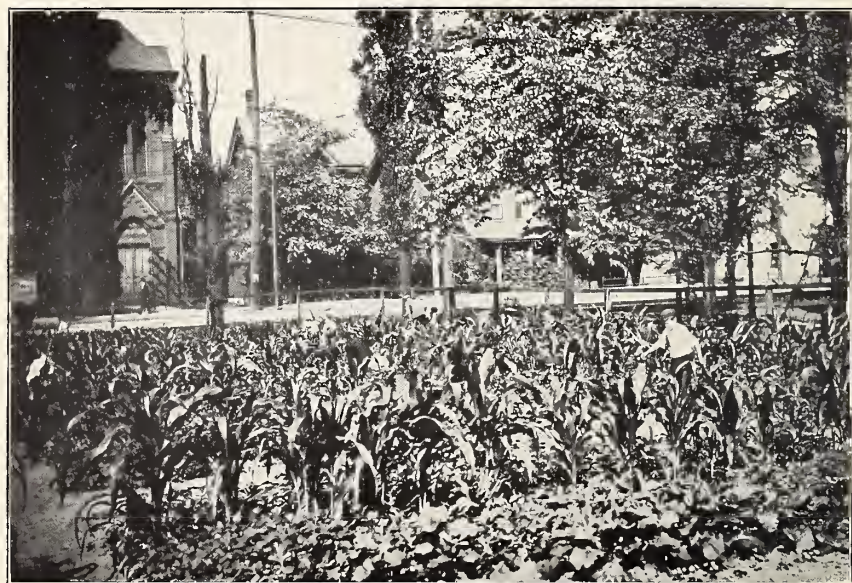


FIG. 2.—LEWIS GARDEN, PITTSBURGH, PA.

a bureau of plant exchange, an inspiration to the community, and a place for the collaboration of practical æsthetic and educational knowledge of children's and home gardens, which may in the end develop a strong and united system of gardens in Pittsburgh.

It has been difficult to secure teachers who have had the proper social, practical, and pedagogical training to meet the requirement necessary for one taking charge of the gardening for a district. A plan of affiliation has been formed between the playground association and the University of Pittsburgh whereby the supervisor of gardening gives a course at the university, the credits for which are counted by the school of education. Six teachers were enrolled in this course last year.

There are several unique features connected with the garden work. At the Trace garden, on Mount Washington, an experiment has been started in chicken raising. (Pl. II, fig. 1.) At a cost of \$10 per coop a number of well-built chicken coops have been bought. Upon the signing of the following agreement a boy is put in charge of a coop:

POULTRY CLASS, TRACE GARDEN.

The undersigned wishes to make application to become a member of the poultry class at Trace garden.

In making this application I understand that the chickens and food for the same will be furnished by the playground association, but that I will become owner as soon as I have paid said association from my receipts the original cost of the chickens plus the cost of food consumed. I further understand that when I have completed the poultry course and have paid for my chickens, as above stated, I may take them home or dispose of them as I see fit.

If I am assigned a coop of chickens I hereby agree to follow exactly the directions of the teacher and to pay to him all money received from my flock until it is paid for.

(Signed) _____.

Parent, _____.

NOTE.—The teacher in charge will give a receipt for all money received.

The need of a greenhouse was felt. The supervisor obtained the use of a wooden building (78 by 18 feet) at Washington Park, which was remodeled for greenhouse purposes. The even span wooden roof was removed from 48 feet of it and replaced by a lean-to glass roof. The remaining portion was used as a potting shed and attendant's room. A bulb cellar was excavated under part of the house. Classes of children work every afternoon planting and caring for bulbs, making cuttings, planting, and studying seeds. A section of the house is devoted to pets, and the children are most eager to learn about the ones especially adapted for their homes. Mothers' classes will be organized and the teachers in charge of the greenhouse

will aid the people of their district in planning and planting gardens and window boxes.

Piano boxes are used at the different gardens for tool boxes. They are fitted up differently than in most places. Instead of the oblique side being used as the cover one of the narrow, vertical ends has been hinged and used for the opening. Two sets of horizontal strips have been fastened inside, one for rakes to rest on, the other for the hoes, leaving plenty of room at the bottom for garden lines and seeds.

The playground association has started the sale of bulbs and seeds in the schools after the example set by Cleveland. About 45,000 bulbs were sold to the children at cost in 1910. Printed order sheets are sent into the schools and later, at the time of distribution, printed directions are given the children. The forms used are shown below.

THE PITTSBURGH PLAYGROUND ASSOCIATION—DEPARTMENT OF NATURE STUDY AND GARDENING.

707-711 LYCEUM BUILDING, PITTSBURGH, PA. INDIVIDUAL ORDER.

Place stamps under variety of same name.

Crocus.			Tulip.		Narcissus.		Hyacinth.			
Mixed.	Blue.	White.	Scarlet.	White.	Solid yellow.	Paper white for indoor culture only.	White.	Red.	Extra white.	Extra blue.
½ cent.	1 cent.	1 cent.	1 cent.	1 cent.	2 cents.	2 cents.	3 cents.	3 cents.	6 cents.	6 cents.

Name..... City.....

School..... State.....

Room No.....

Your bulbs and directions for planting will be delivered in October.

DIRECTIONS FOR BULB PLANTING.

Indoor culture.—Plant the bulbs early in October, using rich garden loam (black soil). The pots should be filled so that the top of the bulb will be even with or slightly below the top of the pot. Water thoroughly and place the pots in a cool, dark cellar or closet, being sure to water at least once each week. In case it is impossible to place in a cellar or closet the pots may be buried in the ground and covered with 6 or 8 inches of soil. In planting, place only one variety in a pot and do not crowd the bulbs. In case the pots are buried in the ground the surface of the soil should be covered with straw, cloth, or boards to prevent solid freezing. About January 15 take up the pots and place them in a warm room (not near the stove) and keep them away from the sun at first, but gradually move them toward the window to accustom them to the light. After the bulbs have been brought out for about a week they should have been moved into stronger and stronger light until they are ready to stand the bright

sun. While the bulbs are growing they need much water and should be watered freely every day. On cold nights the plants should be moved away from the window; and if they should freeze, a good remedy is to sprinkle with cold water and keep away from heat and bright sunlight for a time.

If a succession of flowering is wanted, the bulbs should be brought in at different times after January 15.

Those who have a cool, dark cellar may grow hyacinths in water in the "hyacinth glass," treating them as described for potted bulbs. In growing bulbs in this way they must be kept in the dark the same length of time; the glass must be kept full of water; and if a little charcoal is placed in the glass, the water will be kept pure.

Outdoor culture.—Plant the bulbs as soon as they are received, 6 inches apart and 3 inches deep, in good soil. As soon as the planting is done water the soil thoroughly. A little manure placed over the bulbs will help to protect them during the cold weather.

The Pittsburgh gardens have been unusually successful. They are orderly and well kept under the most difficult conditions. (Pl. II, fig. 2.) Many of them are on steep hillsides. Sudden and severe showers cause much damage by washing; the soil is very poor; yet through the untiring effort of the supervisor and his assistants it is not unusual to find the outdoor gymnasium almost deserted, while the adjoining garden is full of industrious workers. One tubercular boy gained 14 pounds during the summer. Such strictly educational work on the part of a playground association is very unusual and well worthy of imitation by other cities.

CLEVELAND.

The organization and development of school garden work in Cleveland is comprehensive and progressive. It was inaugurated in the public schools in 1904 and conducted jointly by the Home Gardening Association and the board of education. In 1905 the latter body assumed control of the work. Detailed accounts of this early work may be found in Bulletin 160 of the Office of Experiment Stations, entitled "School Gardens."

Mr. Charles G. Orr, director of schools, created in 1905 the department of school gardens, with a curator at its head, the first position of its kind and at the present writing the only one in the country. Miss Louise Klein Miller has occupied the position since its creation. Cleveland occupies a leading position in the school-garden movement in America. Its school grounds are uniformly attractive. (Pl. V, fig. 1.) The director of schools has realized the subtle influence of surroundings upon a child's education. He has not left it to the whim of a school principal as to whether or not the school yard shall be sightly, but in his wisdom he has organized a separate department of school gardens with a responsible head whose duty it is to plan attractive school grounds and put such plans into execution.

At present the children's part in the school garden is voluntary and not a part of the regular curriculum, though it permeates the entire educational system. The garden labels, markers, and stakes are made in the manual training schools; the domestic-science classes cook or can the vegetables they have raised; flowers and vegetables are used for drawing and painting; cotton, hemp, flax, and broom corn are raised to illustrate geography lessons; and nature study and language lessons have been vitalized by the garden.

The activities of the school garden work of the Cleveland public schools, as now organized, include the following features: Gardens for the children in the graded schools, for defective children, backward children, and delinquents; a botanic garden, an economic and kitchen garden, a nursery of trees and shrubs, propagating centers, the improvement of school grounds, and illustrated lectures. Sixty illustrated lectures were given in the schools last winter to illustrate the principles of soil preparation, cultivation, seed planting, crop rotation, and harmonious color schemes in gardens.

Until the present time all activities have been confined to the grammar schools, but the new West Side Technical High School will have courses in agriculture, horticulture, and landscape gardening. It will have a greenhouse, a nursery of trees and shrubs, and will propagate plants for school ground improvement.

The roof of the new high-school building will be provided with bay trees, vines, and flowering plants, and will be used as a study room by the students.

The most notable piece of work done by the school garden department during the past year was the establishment of the memorial garden at Collinwood in memory of 173 children and one teacher who lost their lives in the Collinwood fire. (Pl. III.) For two years before the district of Collinwood was annexed to the city of Cleveland nothing had been done there and the only suggestion concerning a memorial was for a monument with the children's names inscribed upon it. After the annexation of the district, the curator of school gardens solved the problem to the complete satisfaction of the people of the district and the school officials by planting a memorial garden. Half of the space is inclosed in a colonnade of Doric columns 12 feet high connected by trellises, with an impressive memorial gateway at the main entrance. A water garden 35 by 50 feet occupies the site of the old building. This, with garden seats, a sundial, a formal flower garden with its hedges and shrubs, makes a more effective memorial than a shaft of granite. At the rear of the children's gardens is to be a pergola and a summerhouse, where the children can have an outside schoolroom for their nature study, gardening, and reading lessons.



FIG. 1.—SITE OF THE COLLINWOOD SCHOOL DESTROYED BY FIRE.

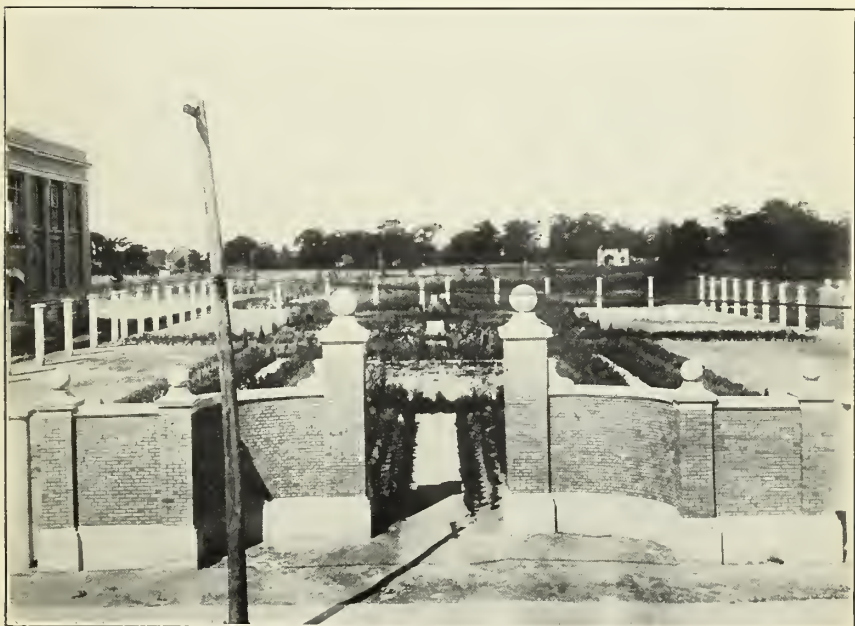


FIG. 2.—MEMORIAL GARDEN ON THE SITE OF THE COLLINWOOD SCHOOL, COMMEMORATING THE DEATH OF 173 SCHOOL CHILDREN AND 1 TEACHER.



FIG. 1.—AT PLANTING TIME.



FIG. 2.—WITH CROPS AT THEIR BEST.

TWO VIEWS OF WILLARD SCHOOL FARM, CLEVELAND, OHIO.

WILLARD SCHOOL FARM.

The new West Side Technical High School, previously referred to, will occupy an entire block. The land has been in possession of the school authorities for several years, and for the past two years has been used by the boys and girls of the Willard School as a training garden, under the direction of R. F. Powell, formerly superintendent of the Vacant Lot Association of Philadelphia. While the board of education has borne the expense, this farm school has not been under the care of the school garden department. The plats are larger than usually found in school gardens—20 by 40 feet. Fifty-six such plats were cultivated in 1910 by 62 children of the sixth, seventh, and eighth grades. The work was enlarged in 1911 to accommodate 165 children, including all grades. (Pl. IV.)

Most valuable training is given the children. The gardens are remarkable in appearance for children's gardens. The crops have been excellent. At the rate tomatoes have been gathered, an acre would yield 2,722 bushels. Eight gardens, taken in regular order, were selected for a careful estimate of the yield of sweet corn. The space occupied by the corn was 12 feet wide and 86 feet long—less than 1,100 square feet—on which there were produced 600 well-developed ears ready for use, the small, undeveloped ones not being counted. At this rate, selling for 15 cents a dozen, an acre would yield \$275 worth of corn.

The expense above the salary of the teacher of conducting this five months' summer school for children was \$1.06 per child, but the crops which the children grew were worth four times that amount in the retail market.

Two compositions written as school work by two sixth-grade children show plainly their pleasure in the garden. The first of these won the second prize in the girls' section.

HISTORY OF MY GARDEN.

I received my application card for a garden from Miss Deighton May 31. I took it at once to Mr. Powell, and was awarded a garden 20 feet wide and 40 feet long. Owing to the wet weather, I could not till the soil until the following Saturday, June 4.

Under Mr. Powell's direction I then plowed and softened the dirt and planted 4 rows of carrots, 4 rows of lettuce, 4 rows of onions, 4 rows of beets, and 4 rows of radishes. In just 21 days the radishes were ready for sale. My lettuce and onions followed a few weeks later.

In July my beets and beans were ready. At this time beans were bringing 8 cents a quart, or 2 quarts for 15 cents. Including radishes, onions, lettuce, beans, and beets, I have earned \$5.40 up to August 17. Out of that I have bought myself a gold bracelet and have a little money left.

After disposing of all my onions, I then plowed and got the soil ready to plant my celery and a second crop of beans. I planted 108 celery plants, and,

with the exception of 8 or 9, they all came up. I expect to dispose of my celery very readily to my customers as soon as it is ready for sale.

I also had a good crop of corn, but it is the favorite vegetable at our table, and it was so sweet and good I couldn't think of selling it. Then came my tomatoes, the best crop of all. They were not very large, but were very select, and there were lots of them. I think there were more than 200 on 20 plants. I also have cabbage, peppers, kale, Brussels sprouts, and kohlrabi, which I am saving for exhibit at the garden festival. I also planted parsnips, but I am not going to say very much about them because they never came up.

After all this collection of vegetables above mentioned, I have still 4 rows of carrots, 4 rows of beets, 3 rows of radishes coming up, 4 rows of beans (second crop), 2 rows of corn, 2 rows of tomatoes, and 1 row of peppers, yet to sell or use at home. I hope, if I have given satisfaction to my supervisor, Mr. Powell, that the size of my garden may be increased to double its present size next year, because I will be 1 year older, 1 year bigger, and 1 year stronger, and I will be able to enlarge my list of customers.

Another pleasure which I enjoyed greatly was the cooking lessons given me by Miss Ola Powell, teacher of domestic science at Oakland school. I learned to can and to cook most all the different kinds of vegetables that grew in my garden. I am greatly interested in all the branches of this work, and hope some day to understand it perfectly.

RHEA LYON,

9515 Willard Avenue, Willard School, Sixth Grade, Age 11 Years.

SEPTEMBER 17, 1910.

THE LIFE OF A JAPANESE RADISH.

I am the seed of a Japanese radish. My ancestors came from the far-off Japan. The first of my family was brought to the United States only two or three years ago. Even to-day there are very few of us in the country. One firm in Missouri has all there are of us.

Mr. Powell gave 10 of us to some boys to plant. I fell into the hands of Paul Roberts, one of the Willard School gardeners. When I was planted, about September 20, I was put into rich, moist soil, with plenty of space, so that I could grow and spread my huge leaves as far as I could reach.

After I had been buried about three days I peeped out of the ground. I was given water every day, and within two weeks my leaves were 3 inches in length. They were now dark green, long, and slender, with irregular edges. My body is between a white and a pale yellow. I am at least 2 inches in diameter at the thickest part, and though much larger, I shall be long and slender like other radishes.

I ought to weigh about 15 pounds. Some of my family reach the remarkable weight of 40 pounds. At the present time my leaves are 3 feet high, and I feel pretty big. Paul is very much interested in me, and has taken good care of me and will take me out of the ground when Jack Frost comes again.

PAUL ROBERTS,

Age 11, Sixth Grade, 2122 West Ninety-fifth Street.

NOVEMBER 11, 1910.

HOME ECONOMICS ADDED TO GARDEN WORK.

Next in importance to a knowledge of producing vegetables is the knowledge of how to put them to the best use—to can, preserve, cook, and serve them in the best way. (Pl. V, fig. 2.) A home economics

summer class was organized among the gardeners at the Oakland School, Cleveland, in 1910, and a teacher skilled in both gardening and cookery put in charge. The ambition of the teacher has been to make the cooking, canning, and preserving so simple that little ones of 8 and 10 years can readily accomplish the work. Three such kitchen gardens have been in operation in 1911, each one open two days in a week.

In the first two weeks at one school the children canned and preserved 150 jars, besides receiving instruction in the cooking and serving of 6 different kinds of vegetables grown in their gardens. An exhibition at the opening of one of the new market houses in Cleveland was most creditable to the teacher in charge. Every vegetable grown in the gardens had been canned for winter use in a manner that would have been a credit to most experienced house-keepers.

CHICAGO.

Crowded conditions in Chicago prevent much garden work around the schools, but the tendency is for principals and teachers to avail themselves of the opportunity wherever ground can be spared. The general scheme is a border 3 feet wide around the playgrounds for spring planting, though a few schools, notably the Sprye, Forestville, and Van Vlissingin, have done elaborate school-ground decoration. Mr. George A. Brennan, principal of the Van Vlissingin School, is the chairman of the buildings and grounds committee of the principals' club. The school is located in what was country a few years ago. The people of the district are mostly of Dutch ancestry and have much native ability in gardening. There is, therefore, general local interest in the subject, which is an asset to the enthusiastic principal of the school. There are 1,400 children in the building under the care of 32 teachers. Beside following the regular course of study in nature subjects, Mr. Brennan is an enthusiast on the subject of economic forestry. At the Chicago Municipal Welfare Exhibit held at the coliseum in September, there were classes from this school at work making sprays and cements, showing methods of curing diseased places on the trunks of trees and killing the tussock moths, cottony scale, and plant lice. The pupils last year killed 5,000 tussock moths and 25,000 other noxious insects. One fifth grade boy showed 15 neighbors the cottony scale and taught them the remedy. So well had the children killed the tussock moth that few could be found for exhibition purposes. Committees were formed for the summer care of the garden, which was watered and weeded most conscientiously.

The committee of the principals' club, previously referred to, has recommended that a greenhouse nursery be established at the parental school for the propagation of plants for the Chicago schools, and that a nursery be established at the Bowen High School to give a more practical trend to the high-school courses in biology and at the same time provide planting material for the schools. An acre of land has been obtained for the latter purpose but so far there has been no money to carry out the project. The Chicago Teachers' College has recommended that a nursery and greenhouse be established at the college for the training of its students. While little has come of this recommendation, the trend of feeling is evident that teachers must be trained in agricultural subjects.

Elementary gardening is included in all grades in the nature-study course. Abstracts from this course of study are given to help others planning the same line of work. Time allowed is $1\frac{1}{4}$ hours a week in the first three grades and 1 hour in the grades above.

NATURE STUDY COURSE.

First grade.—Experiences with raising flowering plants in window gardens by the children; planting and caring for winter flowering bulbs in group window gardens; individual experiences in germinating seeds and growing the plants in window gardens.

Second grade.—Exhibition of home-grown plants; the growing of winter flowering plants to take home; what the children know about the use of common vegetables in the home; about the growing of vegetables; the testing of vegetables brought by the children to learn which parts are good for food; an experiment in growing some of the common vegetables, such as bush beans; beets and carrots grown in window gardens for decorative effect; preliminary soil studies, by picking over, sifting, finding pebbles, roots, and twigs; the planting of an ornamental window garden, using flowers; the growing of early summer flowering bulbs in group window garden to produce blossoms before the end of the school year, summer flowering bulbs to be started.

Third grade.—Experiments in window gardens to determine the essential conditions for seed germination and growth; need of heat, water, light, soil, and air. The planting of seeds of "crop" plants, such as corn, in pots or boxes to transplant at home, to care for during the summer, and to return for the plant exhibit the following autumn.

Fourth grade.—The planting of seeds of rapid growers in order to study their life cycle; the various means of growing plants with which the children have not already had sufficient experience, such as by cuttings, tubers, summer flowering bulbs, runners, and roots; the continuance of study of life cycle of plants not completed previously; the planting for increase in yield at school and at home.

NOTE.—Sunflowers, zinnias, dahlias, golden glow are suitable to plant in school grounds; the potato, corn, peanut at home.

Fifth grade.—Exhibition of such home-grown plants as the children have raised; the planting out of doors, at school, and at home, where possible, beds of spring-flowering bulbs in October or early November. Simple experimental studies with building material and with the preservation of wood and iron.



FIG. 1.—ENTRANCE TO ROSEDALE GARDEN, CLEVELAND, OHIO. GLACIAL BOWLDERS IN FOREGROUND COLLECTED BY CHILDREN WHILE PREPARING THE GROUND.



FIG. 2.—DOMESTIC SCIENCE CLASS, CLEVELAND, OHIO, AT WORK ON VEGETABLES RAISED IN THE GARDEN.



FIG. 1.—BEFORE BEING RENTED BY THE GARDEN CLUB.



FIG. 2.—AFTER CLEARING AND PLANTING.

THE TRANSFORMATION OF A CITY LOT IN MINNEAPOLIS.

Simple experiments with soil, soil materials, and fertilizers, preparatory to growing plants; the growing of plants and the caring for spring-flowering bulbs planted out of doors in the autumn; watering window gardens both from above and below; growing plants with and without fertilizers; protecting plants from insects; plants suitable for different situations; planting of hemp to be used in autumn.

NOTE.—Flax sown in June among the other plants in the out-of door garden keeps down the weeds and furnishes material for the autumn of the following year.

Sixth grade.—The decoration of the school and home grounds with herbaceous perennial vines and flowers; observations and reports on the way in which such plants are used in the parks and other places in the city; the utilization in conjunction with pupils of other grades, of any vacant lot available for a neighborhood garden.

Seventh grade.—Experimental studies of bacteria, yeasts, and molds in relation to man's food and health; preservation of food by drying, heating, sweetening, pickling, and freezing.

Eighth grade.—Cold frames, hot beds, germinating boxes for south windows, or even small greenhouses, to be prepared in the winter for spring planting; plants started in the same to be distributed among the other grammar grades for use in planting and cultivating vacant lots or for distribution in the school neighborhood; the school exhibition of home-grown plants managed by pupils.

NOTE.—One-half of this work should be selected and covered during the year.

PARENTAL SCHOOL OF CHICAGO.

One place in the Chicago school system where gardening holds a very important place is in the Parental School. In its aims and management the Parental School is very similar to a reform school, though it is designed to receive habitual truants and incorrigibles even when they have committed no direct offense. The child is taken away from his surroundings for either a definite or an indefinite period, subjected to a special regimen of nutrition, physical education, and control, which is designed to correct bad habits and give a right attitude toward school life and incidentally to exert a deterrent influence. The Chicago Parental School has 70 acres of land for which the city paid \$1,000 an acre. Thirty acres more are rented. A farmer directs the cultivation of this land, boys being used where their physical ability allows it. They herd and clean the cows and assist in corn cutting and filling the silos, but boys of 14 are not sufficiently developed to do heavy farm work.

The cottage or family system is in vogue. Each family has its own playground and its own chicken yard wholly looked after by the boys. Ten acres of land are set aside for individual plats. These plats are laid out uniformly, giving the appearance of a well-ordered truck garden, though divided up among the 300 boys attending the institution. The products from these gardens are used on the cottage tables. The boys appear very happy in their work, in their play, and in their schoolrooms. The teachers are selected from the regular

corps of public-school teachers. The writer observed a very orderly class of boys gathering tomatoes under the direction of their classroom teacher. A chance conversation with a boy of 13, an Italian, named Mike, who had been an inmate of the school, but at the time was paroled, attending the city schools, showed the high regard that the street waifs have for the school. Mike was on his way to the school to see some of his old friends and expressed a sincere regret that he couldn't stay on the farm in summer, when there was little for a boy to do in the city but stand around the streets. He said he had planted beans in a box at home, but that wasn't the same as a garden.

MINNEAPOLIS.

VACANT-LOT GARDENING.

A stranger in Minneapolis during the summer of 1911, unless he were totally blind to his surroundings, could not fail to be impressed with the evidences of civic interest as shown by the displays of flowers in the business sections. Along Nicollet Avenue from the Northern Pacific depot both wholesale and retail houses had flower boxes at almost every window. In the show windows of a large jewelry store were photographs of home and school gardens. In one of the busiest portions of the city, surrounded by billboards, there was a flourishing vegetable garden that would do credit to a good truck farm. (Pl. VI.) Lots planted with vegetables and flowers seemed more numerous than the uncultivated ones. Most of this was due to the efforts of the Garden Club to beautify the city for the civic celebration held in July.

A year previously the Garden Club was just coming into existence, pledging itself to promote home, school, and neighborhood gardens. Under its auspices one vacant-lot garden was established for 16 boys, members of the Boys' Club. The boys raised their vegetables, sold them, received their prizes, and the garden dropped from the public sight, but the benefit to the boys was not lost, for when the Garden Club in 1911 began a campaign for a more beautiful city, 10 of the 16 boys entered into competition with the adult population in cultivating vacant lots.

The campaign of the club was started by offering through the newspapers to obtain for anybody the use of any vacant lot he might choose, to plow and harrow it for planting, to supply the necessary seed, and to furnish a plan and expert supervision. All a gardener was required to do was to select his lot, notify the Garden Club, pay his dollar membership fee, and plant his seeds. As a result of this offer 435 gardens were cultivated by the club members and yielded

bountifully. Not more than 6 per cent of them were failures. Such a generous offer of assistance required money to meet the obligations. The dues furnished over \$400, but the bulk of the money came from the funds of the civic celebration. The committee in charge placed \$3,200 at the disposal of the Garden Club to dress the city for the celebration. Judicious and persistent advertising, combined with expert supervision and inexhaustible enthusiasm on the part of those in charge account for the success of the work. Application blanks were sent broadcast and the same form appeared for many days in one of the daily papers. There seemed to be little difficulty in securing lots, owing to the cooperation of the real estate board. After a lot was secured an agreement was entered into by the gardener and the owner of the lot whereby the gardener would surrender the lot on five days' notice. The Garden Club also held itself responsible for the cleaning of all vacant lots in the city. In this they enlisted the aid of the police department. Blank cards were given policemen upon which reports were made of the condition of the lots. Six hundred lots were cleaned by the club. All information in regard to vacant lots and gardens was carefully catalogued by means of the card system. This information was very complete. The application and other forms shown below are worth study by those contemplating the same kind of work.

AN OPPORTUNITY FOR SERVICE.

Don't you want to help beautify the city for the civic celebration week?

Don't you want to decorate your own lawn and grounds as a permanent investment?

Don't you want to have fresh vegetables all summer, for your table or for sale?

The Garden Club of Minneapolis will find you a vacant lot, plow and harrow it, give you seeds and plants for it, furnish expert supervision and instruction all summer long, and give hundreds of dollars in cash prizes for successful work. It will help you beautify your home grounds by giving advice on the vegetables and flowers to select, by coaching you with personal letters, answering in detail any questions you may ask, and by supplying you the bulletins issued for the vacant lots.

You must help. The cost to you is nominal. Read the details on the other side of this page, and join the Garden Club of Minneapolis at once.

APPLICATION FOR MEMBERSHIP.

The undersigned hereby makes application for membership in the Garden Club of Minneapolis and incloses \$1 for dues in full for 1911.

The applicant also requests the privilege of cultivating a garden near his home in the season of 1911, membership in the Garden Club being essential to competition for the prizes.

The applicant, on accepting a garden, agrees to subscribe to the rules submitted by the superintendent; should he decline to do so, or should no garden be assigned to him, it is understood that, at his request, his dues are to be returned and his membership in the Garden Club canceled.

Applicant's name-----

Applicant's address-----

DETAILS OF THE GARDEN PLANS FOR 1911.

The Garden Club of Minneapolis, acting in harmony with the 1911 civic celebration committee, plans to make Minneapolis one huge flower garden, and at the same time furnish such an impetus to flower and vegetable growing that the reputation the city gets this year will be permanent. Every citizen of Minneapolis should be a member of the club.

Ten school gardens are to be planted. Instructors—experts from the agricultural college—will supervise this work in the morning and be in the vacant-lot gardens in the afternoon. The vacant lots will be divided into family gardens about 50 feet square and there will be room for flowers and experimental vegetables. The bulletins will be issued frequently and will form a complete textbook of gardening adapted to Minneapolis. At the end of the season you should be well equipped to operate a garden both for pleasure and profit.

The only condition governing your cooperation in this important and fascinating work is that you become a member of the Garden Club of Minneapolis. Sign the application at once if you know of a vacant lot you would like to use, let us know about it and we will get it for you. With your application write us a personal letter describing fully your desire, and we will use our best efforts to satisfy you.

If you want to operate a vegetable garden only on your own premises scratch out the last two paragraphs of the application blank, and your membership will entitle you to write to our gardeners as often as you wish concerning any details of gardening, and to receive detailed answers thereto by return mail, the only cost being a stamp for the reply. It will also entitle you to the bulletins of the Garden Club, the only cost being postage thereon, an estimate of which will be given you later, and supplied by mail. Bear in mind that this extra cost falls only on those who are gardening at home. If you are using a vacant-lot garden, instructions and bulletins will be furnished absolutely free.

If you don't care to operate a vacant-lot garden or have not the room for a garden at your home, resolve now to beautify your neighborhood and especially your own premises by planting flowers and shrubs, and send in your dollar and your name, ignoring the blank. You may rest assured that your money will be spent to good effect. The only members of the club that receive any pay for their services are the expert gardeners from the agricultural college.

Fill out the application to-day. Mail it at once with your dollar inclosed and, if you like, a letter asking whatever questions you desire or giving whatever advice you can. Make checks payable to Miss Gratia Countryman. For additional information write Leroy J. Boughner, president of the Garden Club of Minneapolis, 214 Plymouth Building.

AGREEMENT.

Know all men by these presents, That the undersigned owner hereby grants to the Garden Club of Minneapolis the use of the vacant lot at _____ as a vegetable and flower garden and the right to the produce of the same is hereby given to said Garden Club to be used by such club according to its rules and regulations governing the cultivation of such lots for the season of 1911, it being understood and agreed, however, that said lot shall be surrendered by the person using such lot at any time upon five days' written notice therefor, and that in case said lot shall not have been surrendered before October 1, 1911, said Garden Club or its lessee shall remove all stones, rubbish, or other articles placed by them on such lot and rake and seed the same to clover without expense of any kind to the owner thereof.

Owner.

By -----

Authorized Agent.

The foregoing is accepted upon the conditions therein named.

Garden Club of Minneapolis.

CARD FURNISHED POLICE DEPARTMENT FOR REPORT ON VACANT LOTS.

The vacant lot situated at -----

is in a dirty condition for the following reasons:

Ashes-----	Tin Cans-----	Boxes-----
Lumber-----	Weeds-----	Paper-----
Excavation-----	Dump-----	Rubbish-----

Check the reasons and return card at once.

CARD USED IN CATALOGUING INFORMATION ABOUT MINNEAPOLIS GARDENS.

Gardener-----	No-----	Sec-----
Address-----		
Garden-----	Size-----	Sq. ft-----
Owner or agent-----	Consent-----	
Plowed-----	Seeds del-----	Plants del-----
Cost, \$-----	Revenue, \$-----	Profit-----
Plan-----	Execution-----	Beans-----
Corn-----	Lettuce-----	Onions-----
Flowers July 1-----	Vegetables July 1-----	Receipts-----
Lot desired-----	Total-----	
Remarks-----		

REVERSE SIDE OF CARD USED IN CATALOGUING INFORMATION ABOUT MINNEAPOLIS GARDENS.

COST.

GARDEN CLUB.

Preparation-----	\$-----
Instruction-----	-----
Seeds-----	-----
Administration-----	-----
Miscellaneous-----	-----

GARDENER.

Tools (one-third value)-----	-----
Seeds -----	-----
Miscellaneous-----	-----
Total-----	=====

REVENUE.

Beans-----	-----
Beets -----	-----
Cabbage-----	-----
Carrots-----	-----
Corn -----	-----
Cucumbers -----	-----
Lettuce -----	-----
Onions -----	-----
Peas -----	-----
Radishes -----	-----
Squash-----	-----
Tomatoes -----	-----
Miscellaneous-----	-----
Total-----	=====

In order to spread information as widely as possible, the University of Minnesota gave a course of six lectures as a part of its extension course at the Young Men's Christian Association headquarters. These were thoroughly practical, relating to soil preparation, seed planting, cultivation, weeds, and so forth. One supervisor and six assistants, all young men from the farm school of the agricultural college, were employed to supervise. The superintendent received \$100 per month, the assistants \$60. These salaries were not all borne by the Garden Club, as the board of education shared in the expense. They gave all of their time to the work, patrolling their districts each day. Prizes amounting to \$266 in cash, 1 silver cup, 2 green copper cups, and 200 perennial plants were donated by business men and newspapers. The following scheme gives the score of marking used by the supervisor:

Score card for Minneapolis gardens.

	Points.
Plan of garden-----	25
Execution of plan (neatness and straightness of rows)-----	25
For each of eight vegetables 10, total-----	80
General appearance of flowers July 1-----	25
General appearance of vegetables July 1-----	25
Commercial value of crops-----	20
Total-----	200

The Garden Club realized that much was given its members the first season, and felt it was necessary in order to give the work momentum, but it will not be necessary for its continued success. They propose next year only to plow the land. In the matter of supervision, the people of a district are to meet a supervisor at stated times to witness a demonstration from him of the method of planting a model garden. Prizes will not be given another year.

In the judgment of the writer, the movement has been an unqualified success. A number of gardeners were interviewed—men, women, and children. The evident pride and pleasure shown by them was sufficient proof that more than a passing interest had been aroused. The lots were a fair size—none less than 42 feet by 128 feet. The front of each lot was planted with flowers, an added attraction to a vegetable garden. Owing to the expert supervision given, the earmarks of the amateur were not visible, even in the gardens of those making their first attempts. (Pl. VII, fig. 1.) An unusual feature of the movement was that all classes of people were members of the Garden Club. So often the work has a philanthropic motive back of it. This was not so in Minneapolis. Civic pride aroused all classes of society. A rough estimate is given by the president of the club that there were 50 home gardens to every vacant-lot garden controlled by the club, in all about 18,000 home gardens.

The city celebrated a "clean-up day" and a flower day, on which planting was done throughout the city. Nasturtiums had been selected as the city flower for the year, so nasturtium seed was the most popular for planting that day. It is proposed in Minneapolis to have the children vote for a city flower each year and through the efforts of the press have the children's choice planted everywhere. This is an idea worthy of consideration by other cities.

SCHOOL GARDENS.

Naturally, where so many adults are interested in home gardens, the movement would be encouraged in the schools, so Minneapolis had 10 school gardens, covering over 12 acres of land. (Pl. VII, fig. 2, and Pl. VIII.) Four of these were on school property, three in parks, and the remainder on private land. The gardens were under the direction of the department of hygiene and physical training. This seemed an unusual department in which to place them in the school system, but it was owing to disbursement of moneys. They were supervised, however, by the same men who had charge of the vacant-lot gardens. The board of education paid one-half of the head supervisor's salary and one-fourth of the four assistants' salaries. The children worked three hours a week during school time. This time was divided into two periods, and the work was voluntary. The

plats were 8 by 15 feet planted with vegetables, the products belonging to the children. The blank used as a report card is submitted. It covers practically all the data relative to the garden.

THE MINNEAPOLIS PUBLIC SCHOOLS.												
DEPARTMENT OF HYGIENE AND PHYSICAL TRAINING.												
Name..... Plat No.												
School.....												
Rain dates.	Amount harvested.								Date planted			
								Bunches.		Radishes.		
								Bunches.		Lettuce.		
								Bunches.		Carrots.		
								Bunches.		Onions.		
								Bunches.		Beets.		
								Bunches.		Turnips.		
								Baskets.		Beans.		

MINNEAPOLIS PUBLIC SCHOOLS. DEPARTMENT OF HYGIENE AND PHYSICAL TRAINING.

_____, 1911.

School Gardener:

DEAR SIR: There is enough ground for a small garden 6 feet by 15 feet at our house, where sunlight falls during the middle of the day, and I am willing that _____ should have a garden in this place, and further, I will help him (or her) to plant and care for the home garden during the summer if he starts the work. All seed to be furnished free of charge.

(Signed) _____.

Address, _____.



FIG. 1.—A TYPICAL VACANT LOT GARDEN IN MINNEAPOLIS.



FIG. 2.—SCHILLER SCHOOL GARDEN, MINNEAPOLIS.



FIG. 1.—PIERCE SCHOOL TOOL SHED.



FIG. 2.—PRODUCTS FROM A 6 BY 10 FOOT GARDEN GROWN BY A THIRD-GRADE BOY.



FIG. 1.—ONE OF THE CAMPUS GARDENS.

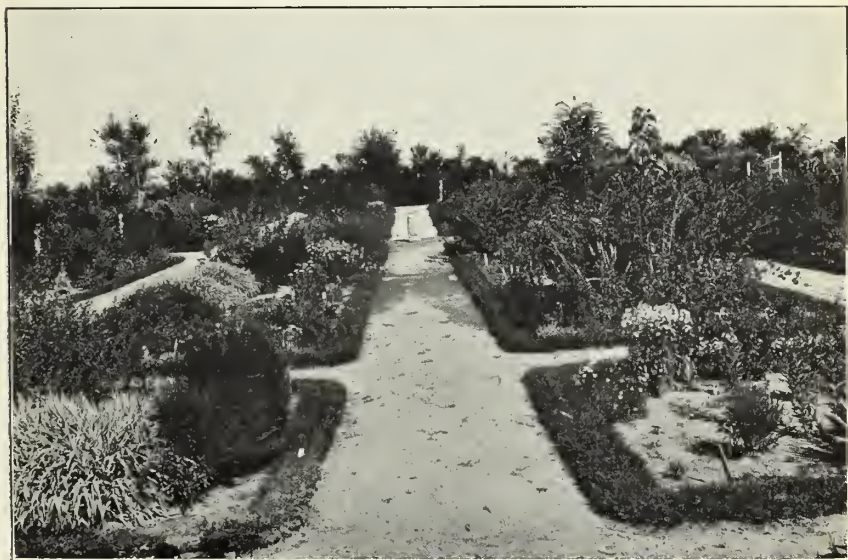


FIG. 2.—OLD-FASHIONED GARDEN LEADING TO THE SCHOOL GARDEN.

ON THE CAMPUS OF STATE TEACHERS' COLLEGE OF COLORADO.



FIG. 1.—FALL WORK IN THE SCHOOL GARDEN, STATE TEACHERS' COLLEGE OF COLORADO.



FIG. 2.—EXHIBIT AT WELD COUNTY FAIR OF PRODUCTS FROM THE HOME GARDEN OF A SIXTH-GRADE BOY.

Home gardens were encouraged. To insure the aid of parents the above blank was sent to them. As a result there were 1,400 home gardens in 1911. Twenty-two thousand packages of nasturtium seeds were distributed in the second to fifth grades, inclusive, of both public and parochial schools.

GREELEY, COLO.

Most worthy efforts are being made at the State Teachers' College of Colorado, at Greeley, to assist in the agricultural development of the State by training the teachers of rural schools. This institution is considered the heart of the educational system of the State. Its effort has been to arouse interest in the rural teachers in country life. It endeavors to put its students in sympathy with their surroundings and not merely to produce highly specialized teachers.

The school garden of this institution is most pleasing. (Pl. IX.) It occupies several acres of ground and is divided into four units—the conservatory, the formal garden, the vegetable garden or school garden proper, and the nursery. In the formal garden are luxuriant masses of gaillardias, delphiniums, pentstemon, lychnis, Iceland poppies, blue sage, snapdragon, Canterbury bells, hollyhocks, and gysophila, backed by dense masses of golden elder, cherries, Russian olives, and cut leaved varieties of sumac.

Leaving the formal garden one enters the school garden proper through an entrance banked with clematis and Virginia creeper. This is a graded school garden, all children of the observation school, from the first through the eighth grade, being trained in it. (Pl. X, fig. 1.) The individual plat system so popular in the East is used for the children from the third through the fifth grades. The sixth, seventh, and eighth grades are given a more advanced and practical course by the planning and planting of a model kitchen garden such as would be of practical value either at a country home or a city home with available ground. The children become familiar with seed catalogues and use them in making plans for their own gardens. These plans are carefully criticised, after which the orders for seeds are sent to the seedsmen by the children themselves, thus giving practice in writing business letters. The first and second grades have community gardens, planting sweet peas, onions, beans, beets, and lettuce.

Items of vital interest to the needs of the immediate locality are carefully taught, viz, methods of potato culture, points in judging seed corn, the value of seed selection. The products are not the property of the children, but belong to the school, the different grades holding sales as the vegetables mature. The kitchen garden of the higher grades turned \$76 into the school fund last year. Home gar-

dens are encouraged, but no definite statistics are kept in regard to them. That they are general is illustrated by the fact that a former teacher in the observation school returned to the school after an absence of two years and found seven out of eight boys still continuing their home gardens.

One of the features of the annual agricultural fair of Weld County, in which the college is located, is the exhibit from this school garden. One hundred and five varieties of garden vegetables were exhibited by the children in 1910. Twenty varieties were entered for competition. Fifteen prizes were received, which in a measure indicates the quality of the vegetables grown. (Pl. X, fig. 2.)

The teachers' college conducts a summer school six weeks in length. An outline of the course offered in 1911 is given below. The classes were large and full of enthusiasm on the part of both students and teacher, the latter's day of work beginning many times at 5 a. m.

ELEMENTARY AGRICULTURE.

Hans Weller Hochbaum, B. S. A.

1. The Theory, Practice, and Material of Nature Study.

A course designed to fit teachers for teaching nature study in the elementary school. In this course we consider:

I. The Nature-Study Idea. A review of the writings of Prof. L. H. Bailey, S. C. Schmucker, C. F. Hodge, and others on the aims and ideals of nature-study teaching. The significance and importance of the nature-study movement. The theory and practice of nature-study teaching.

II. The Material of Nature Study. First-hand acquaintanceship with the good and common things of the outdoor world through actual first-hand observation in garden and laboratory, field and plain.

2. School Gardening.

The principles of landscape improvement applied to school and home grounds. How to beautify the school and home grounds. A review of best native and introduced decorative plants. The laboratory-garden idea. Practice in garden handicraft. Planning and planting the laboratory garden. Soil studies. Plants in relation to soils. The principles of soil and plant management.

The trustees of the college issue quarterly school bulletins. No. 5 of series 10, entitled "Agriculture and Nature Study for Rural Schools," gives a comprehensive idea of the meaning of nature study and the rural school.

A special diploma is given students who take the major part of their work in the department of agricultural education. For 1910-11 the following courses were offered:

Course 1. Nature Study.

The theory, practice, and material of nature study. Designed to fit teachers for teaching nature study in the elementary school. In this course we consider:

I. The Nature-Study Idea. A review of the writings of Prof. L. H. Bailey, S. C. Schmucker, C. F. Hodge, and others on the aims and ideals of nature-study

teaching. The significance and importance of the nature-study movement. The theory and practice of nature-study teaching.

II. The Material of Nature Study. First-hand acquaintanceship with the good and common things of the outdoor world, through actual first-hand observation in garden and laboratory, field and plain. Five hours a week. Fall, winter, and spring terms.

COURSE 2. Elementary Agriculture.

The elementary principles of soil, plant, and animal management. Designed to fit teachers for teaching agriculture in the rural school. Some practical work is given in greenhouse, field, and garden. In addition to the study of agriculture some effort is directed to studying the social and home life of country people, to make the rural teacher feel that she may influence those outside of the school. Five hours a week. Fall, winter, and spring terms.

COURSE 3. School Gardening, Outdoor Art, Plant Production.

Meaning of the school-gardening movement. The relation of gardening to nature study and elementary agriculture. The school garden as the laboratory of nature study and agriculture. Practice in garden handicraft, Planning and planting the school garden. Plants in relation to soils and the management of soils in crop production. Propagation of plants. Seedage, cutting, and graftage. The principles of landscape improvement applied to school and home grounds. How to beautify school and home grounds. Studies of the best native and introduced decorative plants. Five hours a week. Winter and spring terms.

COURSE 4. Soils and Crops of the Farm.

The origin and formation of soils. Classification of types and uses. The relation of soils to plants. Physical properties of soils. Chemical properties of soils. Physical and chemical agencies used in the management of soils to augment productivity. Cultivation, irrigation, and drainage.

Studies of various crops of the farm and their management. Soil and seed selection. Cultivation and care. Harvest, storage, sale, and use of the various crops. Crop rotation. Farm management. Five hours a week. Fall and spring terms.

COURSE 5. Animals of the Farm.

An elementary course in animal industry, in which the types and breeds of farm animals are considered. The care and feeding of farm animals. Principles of feeding. The production and marketing of the various types. Relation of animals on the farm to the soil. Utilization of by-products. Importance of animals in diversifying farm occupations. Five hours a week. Fall and winter terms.

COURSE 6. Dairy Industry and Poultry Husbandry.

Types and breeds of dairy animals. Selection of breeds for dairy purposes. Feeding for milk. Crops suitable for feeding. Care and management of dairy animals. Construction of stables and shelters. The production of pure milk. Care of milk. Handling and sale of milk. The Babcock milk test. Making of butter and cheese. Production and sale of dairy products.

Poultry husbandry. Types and breeds of poultry. Selection of breeds to meet the ideal. Care and management of poultry. Feeds and feeding. Construction of poultry houses and poultry yards. Breeding of poultry. Rearing of young. Production of meat and eggs. Sale of poultry and poultry products. Five hours a week. Spring term.

COURSE 7. Horticulture on the Farm.

Types of plants suited for fruit production. Principles of fruit growing. Selection of varieties. Propagation, cultivation, and management of fruit

plantations. The home fruit garden. Insects and diseases of fruit and ornamental plants. Insecticides and fungicides. Sale and use of fruits. Fruit storage and preservation. The home vegetable garden. Planning, planting, care, and management of same. The principles of landscape improvement applied to the beautification of home grounds. Five hours a week. Fall and spring terms.

COURSE 8. The Farm Home.

Domestic science, sanitary science, and home improvement. The improvement of life on the farm by improving the conditions of the home. Five hours a week. Fall term.

COURSE 9. Rural Sociology.

The social status of rural communities. Social factors in rural progress. Improvement of social life of rural communities. Isolation of the farmer. Means of communication. Social influences. The country church and the country school as centers in rural communities. Social organizations. Improvement and enlargement of these opportunities. Occupations in the country affecting social status. Three hours a week. Winter term.

COURSE 10. The Rural School.

Improvement of teaching methods in the country. The rural school as the center of a rural community. Importance of improving the equipment, indoors and out. Improving the school grounds. The consolidated school. Agricultural education. Five hours a week. Winter term.

In this department practice is given in teaching nature study, elementary agriculture, and the like, in the training school of this institution. This work is under the supervision of people in sympathy with the new point of view in education—experts who are thoroughly in sympathy with the field of the rural teacher and the problems and situations she meets there. Excursions are made to the rural schools in the neighborhood.

UTAH STATE NORMAL TRAINING SCHOOL.

It is difficult to report upon one line of work at the Utah State Normal Training School. To do justice to the institution every line of work should be discussed, for every department is closely related to every other department in the school. The normal training school is connected with the University of Utah as a school of education, its work being recognized by the university in awarding degrees. A candidate for the bachelor of arts degree may take two years of training-school work—one year of theory, the other of practice teaching. The remaining two years must be the required university subjects. Such a degree permits the graduate to teach in the high schools of the State. The school grants also one and two year certificates, holders of which can teach only in the elementary schools.

As the training school is the only normal school in the State, its educational influence is great. One-third of the teachers of the State were enrolled in its summer session of 1911.

The principal of the training school, Prof. W. M. Stewart, believes that his great problem is to connect the schools with the activities of the community. There is an interesting article in the Utah Educational Review, March, 1911, the official organ of the

Utah State Teachers' Association, entitled "Connecting schools with life." The writer, Prof. Howard R. Driggs, head of the English department, is in daily contact with Prof. Stewart. The following statement from him as to the purposes of the school may be considered authoritative and accurate:

CONNECTING SCHOOLS WITH LIFE.

Some Significant Experiments at the State Normal Training School.

The supervisors and teachers of the training school are now developing the plan proposed by Prof. Stewart of bringing more life activities into the school-room, especially the industrial activities.

The general idea is not new, of course; many years ago the normal school added manual training, domestic science, and domestic art to its courses; these are well established, and their worth is unquestioned.

Prof. Stewart would now go further. He proposes to seize upon some of the economic phases of life and see how the money-making motive can be turned to educative ends.

The school garden has been made the beginning of these experiments. Last year over 200 pupils, under the direction of Prof. Abbey, were induced to take up garden work at their homes. Their work in the school garden gave the start; seeds were furnished, and before summer vacation came the home gardens were well under way. During the spring and summer Prof. Abbey visited these home gardens at intervals, to encourage and direct the pupils. The results thus obtained were most gratifying. Many a table was supplied with fresh vegetables by these young gardeners, and in several instances the children made enough to keep them in pocket money besides.

The success of the work, it is believed, can be paralleled in other lines of economic activity. This year the experiment of raising chickens has been begun. A number of the pupils have their little flock of hens already; and every day they come to school glowing with reports of their findings—especially when they do find something.

These pupils are certainly getting a good deal of information on the poultry question. Their nature-study work is greatly enlivened because of these practical returns. A good many live language and other lessons have come out of it, and at least one lesson in practical grammar has been impressed. They soon learn whether the hen is "sitting" or "setting"; and when she cackles they are much concerned to know whether she is "laying" or "lying."

But, fun aside, this problem of connecting the school with life in so realistic a way is full of interest to the teacher.

There are those who hold that the school has no place in the directing of such work. It is an effort, they contend, on the part of the school to supplant the home. "We have no such thought," says Prof. Stewart. "The home is the first of our social institutions and most important. We must do everything sacredly to maintain it. Far is it from our purpose to do anything other than to reenforce the home in its efforts to cultivate qualities in the child that make for high-minded thought and social efficiency. We believe that we are completely within our province when we stimulate the child with a desire to help himself and his parents in their struggle to make ends meet."

"But"—a further objection is urged—"will not such activities promoted by the schools tend to make the child mercenary? Is it not a further step in the direction of commercialism?"

"We admit," continues Prof. Stewart, "the gravity of this objection, but we hold that the schools can help to turn people from their wrong and selfish money habits best by taking hold in a real way of the economic side of life, instead, as now they do, of keeping hands off the problem of money making and money using, and merely reading and idealizing about it.

"The school is an intellectual center—a life laboratory—established for the express purpose of helping and guiding life activities of every kind into proper channels. Our schools have failed in the past largely because they have stood aloof from real life instead of taking an active, intelligent part in it. Our endeavor in this work is to connect up the school with life outside, to help the home, to serve the community."

The agricultural work is under the immediate charge of Prof. M. J. Abbey, formerly professor of biology at the North Dakota State Normal School, author of *Outlines of Nature Study for Utah* and Circular 90, Office of Experiment Stations, United States Department of Agriculture. For a while the garden at the school covered 10 acres, but as the land must be irrigated and water is scarce the amount of land used was reduced. Like other subjects in the normal school, the student teacher receives instruction in agriculture and in turn teaches it to the children of the observation school. Not only are the children trained in the agricultural methods of the locality, but the faculty believes that proper business methods should be taught. The several grades hold market days, prices are sent home to the parents, orders are taken and filled, the money is banked in the school bank built by the children, and later spent upon things needed at the school. All the material for the playground apparatus was bought from money obtained by the sale of the garden products. The apparatus was then made and set up by the boys of the manual-training classes. Such cooperative spirit is worthy of study. A united institution in which every department is working for a common end is the result. No department fails to contribute its share. The department of English publishes a paper, *The Tee Ess Bee*, printed by the students and sold at the time of the raising of money for the playgrounds for that purpose. A clipping from this paper just before the school fair was held states the matter clearly from the child's point of view.

GREATEST FAIR EVER HELD.

Training school to display its work. Many beautiful and useful articles to be sold to raise money for playgrounds.

The training school these days is a very busy workshop. Everyone is preparing for and anticipating the great fair to be held on the hill June 1 and 2.

The sound in the manual-training room reminds one of some large manufacturing company, as we hear the buzz of the saw and the pound of the hammer, while the odor of paint and varnish indicates that the ornamental side of the work is not forgotten.

The boys are busy sawing, pounding, and gluing to make everything fit just right, as all articles must be of a high class of workmanship. Tabourets, tables, plate racks, wastebaskets, pencil trays, and many other very useful things, which are already for sale and would make any mother proud and happy to have as furniture in her home.

The boys are not alone in this beneficial work, however, as some of the girls can use a saw and hammer equal to a carpenter. But this is not all the girls can do.

On entering another room we see a number of girls busy with their needles changing plain bolts of cloth into aprons and belts, greatly beautified by some braid arranged in artistic patterns. The girls are also piecing a quilt here like "mother used to make," by each girl making some blocks. All these set together constitute the large quilt of the school colors—orange and white.

From this room our sense of smell naturally leads us into the cooking rooms. Here we are only allowed to peep, however, and all the girls and boys are adorned in large white aprons mixing, tasting, and baking tempting sweetmeats and other domestic dainties.

On looking into the cupboard we see candies, cookies, doughnuts, bread, and many other delicacies which prove that the girls are excellent cooks. With many utensils and plenty of material for meals they are prepared to make hunger flee to the mountains.

Pictures of the buildings, rooms, and pupils are being taken by the "Kodak Klub," who look longingly at the sky each day, hoping it may be sunny so they may go on with their pleasant work of taking, developing, and printing pictures. The instructor in this work is Mr. Tipton, who looks more anxiously at the sky than any of the rest, as he wants to see the result of the children's first trial of picture taking.

Out on the south side of the building is the garden, situated where plenty of sunshine can strike it and make the small green strawberries grow into large, luscious berries, which make us hungry to think of. Mr. Abbey instructs this work, and early every morning and during the day you may see him out with a class of pupils hoeing, raking, and planting many things which help beautify our school. The long rows of lettuce, radishes, turnips, and raspberry plants, and many other things tell us that Mr. Abbey and the children have not been idle.

Mr. Driggs, too, is as busy as a buzz saw, going from room to room encouraging the children in their language work, which will be justly represented in the fair by this paper, and many other bright and funny things written by the pupils.

The cost of the articles to be sold is very small. Such bargains are like the comet; they come only once in 75 years.

But why are all the pupils working so hard for this? Why are they so interested? Because this is all being done to get money to buy playground apparatus. All the pupils will have as much pleasure from the results as they are having from the preparation of the great training-school fair.

Home gardens are systematically supervised. A circular like the following is sent to the parent for his cooperation in providing land:

HOME GARDENS.

Last year 219 children planted, cultivated, and harvested home gardens. The results were gratifying in nearly every case. This year we hope that every child will have a garden. It may not be possible to plant more than a few feet,

but the benefit to be derived from even this small beginning will make the effort worth while. Very soon we will be able to supply each child with a liberal quantity of seeds. Several of the business houses have offered prizes for this work. Will you cooperate with us to the extent of furnishing your child with a small piece of ground and giving the necessary encouragement?

Signed by parent_____

Name of child_____

Address_____

Date_____

Carefully planned lessons are given by the supervisor and normal students on methods of planning and planting. Later the children are required to fill out the home-garden report.

HOME-GARDEN REPORT.

Name_____

Address_____

What kind of seeds did you receive from the training school?

Have you planted them?_____

How many feet long is your garden?_____

How many feet wide is it?_____

On the back of this paper make a drawing of your garden. Show what you planted in each row.

Does the morning or the afternoon sun reach the garden?_____

Which seeds were planted the deepest?_____

Which next?_____

Why did you plant them in this way?_____

Watch and see which seeds come up first_____

Do you wish more seeds?_____

Did you plant your arbor tree?_____

What care are you giving it?_____

Can we help you with your garden?_____

NOTE.—If the ground is dry it will need water before the seeds germinate. Give it water in the evening. Keep the ground between the rows loose. This will not let the moisture escape. Do not let the weeds grow. They take the food that the young plants will need. Within a few days you will receive a small pamphlet which will tell you how to care for your garden. Please read it very carefully. Those who desire chicks or eggs for hatching please let us know a few days before you wish them. Go to the manual-training room and see the box which we use for a brooder. It does not require heat. Next week we will give you some poppy plants if you have a place to plant them.

Then the gardens are visited by the normal students and reports similar to the following are brought in by them.

REPORT BY LENORA MERRILL.

Normal Training School Report of Children's Garden.

Name of child. Harold Mays, Eighth grade.

Age_____

Address. 775 Eleventh East.

Where was the garden located? Back of house, on side hill.

About how large was it? 12 feet by 20 feet.

What vegetables were planted? Strawberries, peas, tomatoes.

What flowers were planted? None that he cared for.

Did the garden show evidence of good care? No.

Was it free from weeds? No.

Was the soil mulched? Had been, but not recently.

Which of the vegetables were ready for use? None.

In what part of the garden were the children most interested? Harold takes little interest in any part. He planted seeds, but has given it little care since.

Did you see either parent? No; but a relative (lady).

Did you explain the motive we have in furnishing seeds and directing the children's garden? Yes.

Were the parents interested? From report, mother more interested than boy.

What suggestions did you give?

Weeds cleared out, soil mulched and heaped about plants, forming furrows, rather than hard, level ground.

Do you feel that you furthered our work along these lines? Yes; Harold seemed interested in showing his garden and talking about it; I think he will probably care for it better. The lady with whom I talked was apparently interested, and she reported that the mother was.

Information derived from teachers. None. I had taught Harold for a quarter, and so I could tell of him from my own experience. Could not find Mrs. Montrose.

NOTE.—Think of yourself as visiting the home of one of your pupils.

Introduce yourself as -----, from the training school, who has come to see how Harry's garden looks. Explain that we consider this a very valuable part of our school work, and that we are interested in its success. Mention other phases of our school work which you think would interest the parents. Call attention to the fact that many of the children are raising chickens, strawberries, fruit trees, etc. Leave this impression—we are interested in the children and wish to help them in every way possible. Urge the parents to call upon us for assistance.

Reports are also called for from the children on chicken raising, which has been mentioned before. The returns from these reports have not been sufficient to give satisfactory data as yet.

Report of chicken raising.

How many chickens have you? -----
 What breed have you? -----
 Do you care for them? -----
 Do you enjoy it? -----
 When do you feed them? -----
 What do you feed them? -----
 How often do you give them fresh water? -----
 Have you read the books we sent you? -----
 How many eggs do you get a day? -----
 What do you do with the eggs? -----
 How much does the feed cost you each week? -----
 If you sell the eggs, what price do you get for them? -----
 Have you any small chicks? -----
 What care do you give them? -----
 Can we help you in any way? -----

CALIFORNIA.

School-garden work in California is comparatively new. There is no systematized State work. Wherever there is an institution deeply interested in the life of its people, that institution becomes the center of agricultural education for its own locality. The University of California, at Berkeley, the Gardena Agricultural High School, at Los Angeles, and the State Normal School, at Chico, are representative of such institutions. An enthusiastic, self-sacrificing teacher at each place, using whatever material is available, has been able by the success of his efforts to have the school garden recognized and placed on a working basis.

No course of study suitable for the entire State has yet been evolved. It would be a difficult thing to write such a course, as climatic conditions, and consequently crops, are almost as varied as in the entire United States. There is a critical feeling toward courses of study in agriculture that must result in better things. It is felt that most courses require too much investigation on the part of the children; too much pursuit of the why rather than the application of scientific knowledge to present conditions; too much of the work of university laboratories in elementary schools. The courses that have been issued are valuable to the teachers, and most assuredly should not be disregarded because they are not perfect.

A very comprehensive course, carefully written to fit schools without much equipment, was published by Clayton F. Palmer while a member of the faculty of the Los Angeles Normal School. This course has much in it that is suggestive in planning a local course and has detailed information for southern California regarding shrubbery, border plants, climbing and trailing plants, and the purchase of seeds for the same locality. Charts for planting vegetables and flowers have also been issued. These give such seed items as the number of seeds per foot, number of days required to reach maturity, and longevity of seeds in years.

A course in nature study and agriculture for rural schools has been issued by R. O. Johnson, head of the department of biology and agriculture, State Normal School, Chico. A minimum course is suggested in this one, and some very practical hints given to the teachers as to the use of it.

A teacher's manual entitled "Elementary School Agriculture," by Ernest B. Babcock and Cyril A. Stebbins, of the University of California, contains 11 suggestive lessons that should be very helpful to teachers.

The agricultural experiment station has issued suggestions for garden work in California, Circular 46, in which agricultural study is outlined.

The school board of San Francisco appropriated \$700 to be devoted to gardening in 1911. The work is not general. Only two schools could be found that were making any point of agricultural training—the Parental School and the Sutro School.

The Parental School has 60 boys, all of whom have been before the juvenile court and sent to this school. Unlike other parental schools in the West, the boys are only under its control from 9 a. m. until 3 p. m. The rest of the day and vacations they are practically under the same influences that caused them to become members of the school. Miss Rae Alexander, the principal, has found gardening of great assistance in getting close to the real boy.

"As they pull weeds from their gardens I pull a weed or so from them," she expresses it.

The land around the school is a most discouraging sand dune, but the boys have placed planks edgewise around the beds to keep the soil from blowing away and have had fair crops of Swiss chard, potatoes, beans, radishes, and lettuce, though the strong winds of the Pacific seemed bent upon burying them. Earlier in the season, when the school was in session and constant cultivation was given the land, sufficient produce was raised to furnish lunches for the boys, which they cooked themselves under the direction of a domestic science teacher. Miss Alexander looks forward to much character development in the boys from the garden work. There have been a few cases of boys being left for days in the garden on first being sent to the school, until the animal spirits had been worked off by outdoor activity and the boys were ready for the struggle with books.

A more successful struggle with a sand dune can be seen on the lot cultivated by the Sutro School, Twelfth Avenue and Lobos Point. This lot was several blocks from the school and was anything but an encouraging undertaking. Besides being a part of a dune of enormous size, it had been a portion of the camping ground used after the earthquake and was still a dumping ground. It belongs to the school board, being held in reserve for a school building when the population grows in that section. This lot, 150 by 240 feet, was fenced by the school authorities, but the cleaning and grading were done by the children. A large hole was filled with débris of all kinds, including baby carriages, bathtubs, and old beds. Later a portable building was placed over this hole and used for a tool house. Pupils from the fifth to the eighth grades, inclusive, were allowed one hour a week under the direction of one of the teachers of the school, whose class was left in the care of the teacher who sent a class to gardening. A place was made on the weekly program for this work by combining the 40 minutes allotted to nature study and

20 minutes recess. The classes were large, 45 in number. Two crops a year were planted and harvested, though no attention was given them during the summer. Both vegetables and flowers were raised.

UNIVERSITY OF CALIFORNIA.

The college of agriculture of the University of California has been spending money and energy in giving an uplift to agricultural conditions in California. As a whole, the State has appreciated its helpfulness. To the present time its work has been concerned in bettering immediate farming conditions. A demand is now urgent to benefit not only the present generation but the coming one, and to satisfy this demand the university is devoting money and effort to carrying agriculture to the children of California. Its aim is two-fold, (1) to create a more favorable sentiment for farm life, and (2) to readjust the individual to community living. This readjustment must necessarily take place in the elementary schools, for there only can the great majority be reached. The college of agriculture does not wish revolution, it desires readjustment. Through agriculture it is hoped to give redirection to the old subjects.

To accomplish the above aims a traveling supervisor was added to the educational department of the agricultural college. His duty is to carry agriculture to the children. Up to the time of making this report the instructor had found teachers little prepared to undertake the teaching of this subject, so he met the several classes and accepted the responsibility himself, carrying with him from school to school what little apparatus was needed. Three rural schools and two city schools were selected as demonstration centers and were visited once a week. The department of agricultural education has felt its limitations, and in order to increase its usefulness it has planned to issue leaflets from time to time giving definite aid in introducing agriculture and reproducing the lessons taught by the traveling instructor. This supervisor, Mr. C. A. Stebbins, instructor in agricultural education in the university, was an extremely busy man, conducting his own classes in the university, writing courses of study for city and country schools, contributing pedagogical matter to *Town and Country Journal*, a paper circulating among country teachers, organizing the California Junior Gardeners' Association, and editing its official paper, the *Junior Agriculturist*.

"We grow flowers, vegetables, and children in California gardens." This opening sentence of a paper read before the School Garden Association of America by Mr. Stebbins embodies the spirit with which the work is conducted. He considers that the school is an aid to nature in growing men and women. Through the garden

the school may repeat the successive steps in the civic evolution of the race, and thus the children may be brought in contact with the community factors that make the life of one's environment—the market, the bank, the press, the factory. Each of these four factors may be traced to agriculture. Migration, moving from place to place, primitive agriculture, marketing, trading and banking, and manufacturing are the successive steps of evolution.

So the plan of the University of California has been to make school life a copy of community life and to link the school and the community through the agency of the school garden. As an objective illustration of its theory it used the fifth and sixth grades of the Whittier School, of Berkeley, as a garden community on the campus. In groups of eight, under the direction of a student teacher, they worked one hour a week. A combined tool house and school bank was erected, a market was opened by the sidewalk adjoining the gardens, the plats were leased to the children, and a definite system of accounting was inaugurated. The campus garden thus became a laboratory where the faculty could benefit by trial and error until a system worthy of extending over the whole State could be perfected. At the time of this visit the garden was most picturesque with its background of dense eucalyptus trees, surrounded by hedges of most profusely blooming geraniums, fuchsias, poppies, and hypericums. There were individual plats for each pupil, and in addition a large number of plats of flowers, grasses, vegetables, and grains for observation work.

The traveling supervisor also visited four rural schools to give agricultural instruction. His visit was followed by members of the extension class of the university, composed of post graduates and upper division students, who gave the later lessons planned by Mr. Stebbins.

The following lesson, only a part of which is quoted, is a good illustration of the nature of the lessons given. The diagram accompanying it (fig. 2) is a graphic illustration of the relation of the soil to living; without soil there would be no homes, no food, nor life of any kind. From such lessons it is hoped to develop within the children a true feeling for the need of the work.

LESSON ON SOIL.

Unit of instruction. The soil.

General topic aim. To interest the children in soils, to teach the relation existing between soil and themselves.

Specific lesson aim. To teach the composition of the soil, the characteristics of clay, sand, and humus, and the relation of water to the soil.

Children's aim. To learn more about soil, since life depends upon it.

DEVELOPMENT OF LESSON.

Soil is composed of clay, sand, humus. In test tubes or small dishes of any kind give the children individual samples of clay, sand, and humus.

Sand has coarse texture, clay has fine, humus has fine. Class, examine these samples and tell me the names for each. Now, look closely so that you may answer the following questions: (1) In which are the particles the largest? (2) In which the smallest? (3) In which do they roll about the most easily?

Would you rather plow sand or clay? Why? Let me draw a picture of sand and clay particles.

The brick chimney is built by piling one brick upon another. If we should pile and pile particles one upon another what would we build? "Funnels." The same would happen with clay particles. Would you like to know the name of these funnels in soil? "Capillary tubes." In which are the tubes the larger?

Color of sand, clay, and humus; humus is decayed vegetable matter. Notice

the shining sand particles, what color do they give to the sand? What is the color of the clay? The humus?

(With a flame of some kind heat the humus in a tin until it smolders.) Where have you noticed this odor before? What is humus? I found this humus beneath a tree. Where did the vegetable matter come from? Name other sources of humus.

Humus and clay are cold. Sand is warm. (Fill three cans with humus, clay, and sand; put a thermometer in each to determine the temperature.) Sand is

too warm, clay and humus are too cold, what shall we do? "Mix sand and clay." How can we find out if John is right? "Experiment." Yes. To prove a theory one must experiment. (Have children see that one experiment alone does not satisfy as proof.)

(Place in a medium-sized bottle a small amount of humus, sand, and clay. Add water till the bottle is nearly filled. Shake well and set aside for the next lesson.)

Relation of sand, humus, and clay to water. (Develop the great work of water in the living of man. Put the drawing upon the board.)

How does the water get to the soil naturally? Artificially? By the way, is it better to sprinkle or to irrigate? How shall we find out? Yes; by experimenting. This we will do later. (Create questions to be answered by experimentation.)

Gravitational water rapid in sand, slow in humus and clay. I have three glass tubes here each filled with sand, clay, and humus. The material is held,



FIG. 2.—The relation of soil to living.

as you will notice, with cloth tied over the bottoms. I am going to pour the same amount of water in each. In which do you think the water will get through first? Why in the sand, Mary? "Because the particles are larger and the tubes are larger." How many agree? Since we all agree, is there any need of trying the experiment? Why? Yes; to prove Mary's theory. (Pour the water into the tubes.) The sand wins. (When children disagree as to their ideas, let each choose their tubes and imagine a race.) Gravitational water carried food to the plant from the surface soil on its way down. Why is it called gravitational water?

The California Junior Gardeners is the name of an organization of the grammar-grade pupils of California who are engaged in gardening. Over 500 children were directly reached last year through the Junior Agriculturist, a small paper published twice a month by the college of agriculture and sent free to every boy and girl of the grammar grades who has a garden. This paper has a fourfold purpose: (1) To enable the department to reach more children; (2) to review the lessons taught by the members of the extension class; (3) to bind the whole movement together; and (4) to act as a medium of expression for children and teachers.

It is in the hope from the experience gained in these first efforts of the college of agriculture to accomplish the following: (1) Through a traveling instructor and supervisor to organize California junior gardening clubs until at least 3,000 children are enrolled in a great university class; (2) to work out a cooperative marketing plan whereby local merchants will handle each club's output; (3) to organize banks in each school that the economic pull may give momentum to the work; (4) to interest the gardeners in setting aside a portion of their vegetables and flowers for the poor of their vicinity at Thanksgiving time; (5) to hold annual State vegetable dinners in Berkeley with gardening delegates in attendance; and (6) a big class of children growing with their plants and looking toward the university and the country at least twice a month, constituting a driving power for good in the State.

Another very attractive garden in Berkeley was at the Le Conte School. The main building had a beautiful flower garden surrounding it, with palms, araucarias, and black acacias adding a tropical effect. The windows were fitted with flower boxes made by the boys of the manual-training classes. In front of the annex was the main school garden, in excellent view of passers-by. Ninety-six children from the fourth and fifth grades had plats 6 by 8 feet, 2 children cultivating a plat. They worked 1 hour a week under the direction of the fourth-grade teacher, 24 children to a section. As a summer garden, it was the most effective one seen in California. Nowhere throughout the State is the work regularly continued during the summer, but during 1911, probably due to the National

Education Association meeting in San Francisco, the children returned to the garden once a week to cultivate it and garden crops. The main care of it, however, devolved on a most enthusiastic janitor, so interested in the garden that he was seriously considering taking a course at the summer school of the university the following summer. The products were used for nature study, drawing material, etc. The basement rooms of the school looked like a greenhouse, filled with potted plants used in the classrooms in winter.

CHICO STATE NORMAL SCHOOL.

The Chico Normal School was one of the first schools in the State to offer instruction to teachers along nature study and agricultural lines. The present director of this work is R. O. Johnson, who succeeded C. A. Stebbins, now of the University of California. Both men have made sincere endeavors to aid the State in its agricultural progress. The following is an outline of the agricultural work of the school:

The scope of this work in the school has been broadened from time to time until at present the work is given to all grades of the training school (with the exception of the eighth grade, where human physiology takes its place) and in a full year of the preparatory course for the normal school proper. In addition to this, a half year is devoted to the study of methods in teaching agriculture, and each student as a prerequisite to graduation is required to teach one or more training-school classes in this line of work.

The first term's work in the normal preparatory course is taken by both boys and girls, the second term by boys only, the girls taking domestic science instead. In the work for all the grades, as well as in the normal school, the pupils are brought into actual and intimate contact with the materials of the subject, such as animals, plants, soils, and agricultural operations. They are required to learn at first hand just so far as possible the needs of animals and plants, and especially the latter, by actually caring for them. Similarly in all classes are given formal lessons in field and classroom, paralleling so far as possible and practicable the work of farm practice carried on in the field.

The demonstration field or school farm is a tract of land about 3 acres in extent adjacent to the campus and stretching some 200 yards along the banks of a perennial mountain stream, which furnishes at all seasons of the year abundant water for irrigation. The facilities for demonstration work also include a well-equipped greenhouse affording plenty of space for plant propagation. The aim in the work is to make practical farmers and horticulturists rather than trained investigators.

Agriculture in the elementary school.—Through the summer and fall months the pupils in the training school devote most of their time in agriculture to actual work on the school farm with spade, rake, and hoe. Here they learn how properly to use these tools, how to keep them in the best condition for effective use, why stirring and pulverizing the soil is necessary, and the various methods of applying water to the soil by artificial means. On the school farm they learn at first hand what are the various enemies of garden and field crops, the nature and the extent of the damages which these inflict, and the methods

by which they may be exterminated or controlled. Here also they learn how crops are harvested, how stored, and how they are marketed, what crops do well through the winter, the selection of seed for planting, the preparation of the seed bed, the application of fertilizers, and the utility of the various common operations which enter into and underlie the work of the successful plant grower.

Through the rainy season the pupils are taken into the greenhouse and are there given the opportunity of learning through actual experience how soils should be mixed, how temperature should be regulated, and how water should be applied to plants to give the best results; how planting and transplanting and thinning and potting of plants may be done most successfully. During this season also formal lessons are given in the classroom on such subjects as the weather; weeds and the methods by which they are disseminated and the method of eradication; fertilizers and their relation to soils and plants; principles and methods of dry farming and of irrigation; the domestic animals and their care, with special reference to the cow and the horse; birds in their relation to agriculture; other animals (toad, gopher, earthworm, squirrels) in their relation to man; pear blight and other plant diseases and their remedies; scale insects, plant lice, white fly, codling moth in their relation to the fruit industry; the house fly and the mosquito as factors affecting the health of man; beekeeping for pleasure and profit; and insects as helps and hindrances to the agriculturist.

Demonstrational agriculture in the normal school.—About two-thirds of the school farm is set aside for the use of the normal-school classes in agriculture, viz, the classes of the first and second terms of the preparatory course and the class in the methods of instruction in agriculture. At the time it was donated to us by Mrs. Annie E. K. Bidwell the school farm was covered with orchard trees and had not yet been leveled for the purpose of irrigation. This, then, was the first piece of work after the trees had been removed and the ground plowed. The work of leveling was done by the students themselves, under competent supervision. This was followed by the laying off of the ground by the classes into plats of convenient size for the work of demonstration, as planned by the teachers and classes. The work of opening up the main irrigation ditch and establishing the laterals has likewise been done entirely by students.

The school orchard.—A portion of the school farm has been set apart for horticultural purposes. In this orchard are to be grown by the students the staple varieties of fruit and nut trees which have been found to be profitable in northern California, and in the Sacramento Valley in particular. The orchard includes at the present time different varieties of the prune, peach, pear, fig, olive, cherry, and almond. The students have already on the campus a number of orange trees of different varieties in good bearing.

Truck farming.—We believe that every rancher should know something about truck farming, therefore some attention will be given to this kind of work to demonstrate essential points in the successful growing of truck crops on a small scale, especially the potato. In this connection our classes are to learn the value of care in the selection of potatoes for planting, the amount of moisture necessary for successful culture, and the best methods of combating insects and other pests of the potato, the time of harvesting, and the best manner of storing the crop.

Laboratory and classroom work in agriculture.—The work in the laboratory for the normal preparatory students embraces a series of experiments illustrative of the processes going on in the soil, such as the percolation of water

in soils and its effect, the rise of water in soils by capillarity, the evaporation of soil water, the various chemical reactions taking place in the soil in the preparation of plant foods, the accumulation and removal of substances in the soil which are deleterious to plant growth. The experiments given include illustrations of the various activities going on in the living plant, as the method by which plant foods are taken into the plant, the methods by which plant food is distributed in the plant, how water leaves the plant and the way in which the plant is affected as a result. In short, the purpose of these experiments is to show the relation in which plants stand to air, sunshine, water, and soil, and the various adaptations which make these relations possible.

In the field of animal industry such points as stock judging, diseases of animals and remedies for the same, study of various breeds of animals, principles of animal breeding, the feeding and housing of animals, cooperative breeding associations, the raising of horses for driving and for draft purposes, and of cows for beef and for dairy purposes, the care of the dairy cow, the testing of milk, the keeping of records, and so on, are studied.

The study of fertilizers includes a study of leguminous plants and the relation in which they stand to the nitrogen content of soils, the conditions favorable and unfavorable to the work of those bacteria which live in the soil apart from legumes and which influence the amounts of nitrogen present in soils, a study of green manures and of stable manure and care of the latter before applying to the soil, and a brief study of commercial fertilizers. (The making of composts is included in the field work.)

The principles of dry farming are studied in connection with the general problem of control and conservation of soil moisture. As directly bearing upon this subject also, the principles of irrigation by various methods are taken up, and in the field are tested as far as time and opportunity will permit.

In connection with plant propagation a study of seed selection and testing, detection of impurities, germination, and the various means of plant propagation is included. Some attention is given to forestry in which is included the consideration of various plans for reforestation, especially with eucalyptus, the planting of trees along roadsides, and the methods of growing forest trees from seeds.

Training in the teaching of agriculture.—Every student is required, before graduating from the normal school, to teach one or more classes in agriculture for a term of weeks in the training school. This work is carried on under careful supervision and includes the handling of classes in both field and classroom. The place of printed matter in the preparation of the lesson is emphasized, and the student teachers are shown how to gather together from the great number of sources the material on the subject in hand. They are shown how to sift out from this, the important from the relatively unimportant, and how to organize the material from such varied sources so that there may be unity in the presentation, and so that needless repetition may be avoided.

In the class work in the methods of teaching agriculture the students are provided with a minimum course of study. This, because of the almost universal distribution of the things studied therein, will be found serviceable in any part of the State. The principles which should underlie the construction of a course of study in agriculture for any particular locality are developed and fully discussed with the class, thus enabling the teachers we send out to add to, modify, or alter this course to meet the needs of the various communities into which they go as teachers. Specimen lessons are worked out with the class, illustrating the organized structure which should characterize the lesson, good and bad methods of questioning are illustrated, and a number

of the most vital points to be emphasized in agricultural teaching are discussed and clearly illustrated. A profusion of interesting and instructive experiments are put into the hands of the students in printed form and their application to the field work is taken up in as full detail as the time will permit.

Among the topics discussed in the work of methods in teaching agriculture are the following: School gardens and the ornamentation of home grounds, home gardens and the ornamentation of home grounds, living animals in the schoolroom, living plants in the schoolroom and home, weather observations and weather charts, school Audubon societies and bands of mercy, prize growing contests at school and home, excursions for field study of birds.

LOS ANGELES.

Nature study and gardening have a recognized place in the course of study of the Los Angeles schools. The first six grades have nature study; the seventh and eighth a course in agriculture. These courses are given below in full:

THE COURSE IN NATURE STUDY.

FIRST YEAR.

In nature study there exists the happy combination of sense training, motor action, and life out of doors. The beauty and order of the world acts to call forth the marvelous development of the child.

Study of animals.

PETS:

Children's experiences with their pets are most helpful in calling forth in their beginnings the strongest elements of character in adult life. Again, "In every land, barbarous or civilized, children yearn for something alive which shall be their very own."

The dog.	Canary bird.	Chicken.
Cat.	Duck.	Mocking bird.
Rabbit.	Parrot.	Others at the parks.

Pets kept at home or at school.

Their friends, enemies, their life, food, how they sleep, good or harm they do, etc.

STORIES:

Those in which pets tell of their own doings in the world.

In the study of our common domestic animals there is much of interest to the child, and a good deal of added interest to anyone, even though the subject is so very common.

References: Books which discuss the origin and domestication of our domestic animals and the changes which occur under a new environment. See also bulletin on Humane Education, San Diego State Normal School.

FROGS:

Watch the development from the egg.

When hatched these animals are blind and mouthless; soon there appear mouth, sense organs, gills—first a fish, later an amphibian.

The metamorphosis in the frog and toad is almost as profound as in the case of insects.

There is much of interest here for the teacher in the evolution of animal forms.

"Here Nature, with the potter's clay of plastic things in her palms, seems to have tarried in delightful experiment before she shaped the higher and better creatures—appears to have indulged in every passing caprice and suggestion."

Excellent books which introduce the subject are:

Animal Studies, Jordan, Kellogg, and Heath.

The Story of the Fishes, Baskett.

Story of the Amphibians and Reptiles, Baskett and Ditmars.

Story of the Birds, Baskett.

PLANTS:

(a) Interesting stories about the most common or most useful plants and trees.

(b) The growing of plants in vessels of water; for example, the onion, the carrot, the sweet potato.

The growing of beans, peas, wheat, radishes, barley, etc., on moist cotton to show the germination of the seeds.

Attempt no explanation, but let the children observe.

The curiosity of children here is marked—instances are numerous where seeds have been dug up again and again to see how they grew.

For the most elementary work: The seeds personified.

The baby bean in bed. How it awoke. How it grew.

The baby lily in its winter flannels.

The escape of the baby plant from the cradle.

Let each organ of the little plant tell its own story. See:

Life of a Bean, Laing.

Little Flower People, Hale.

Plant Life, Bass.

Mother Nature's Children, Gould.

Plants and Their Children, Dana.

THE GARDEN:

(a) In the spring plant those plants which serve as food for pets—lettuce and peas for rabbit's food, etc.

(b) Violets, pansies, other common and beautiful flowers. Let each child at home or at school, have its own small garden. The constructive and competitive instinct can be utilized in the growing of plants in the garden. Who can grow the most beautiful flowers, the finest lettuce, radishes, etc.?

Reference: Nature Study and Life, Hodge.

INANIMATE NATURE:

Sun, moon, stars, winds, clouds.

Children of the first and second grades readily become interested in the sun, moon, and stars.

Again, the wind and clouds are full of interest.

In beginning this work with the children the approach to this side of nature is most natural through myths which clearly poetize natural phenomena.

Reference: Nature Study in Elementary Schools (Teacher's Manual), Wilson.

SECOND YEAR.

PLANTS :

Enlarge upon the work of the first year.

Suggestions—seed dispersal.

(a) Plants that are carried by animals.

The work of squirrels and birds.

The work of the crow, ants, cattle, dogs, etc.

Seed tramps.

Why some seeds are sticky.

(b) Seeds transported by the winds.

Seeds that tempt the wind by spreading their sails.

Seeds with parachutes.

How the lily sows its seed.

Why some seeds are so small.

(c) Collect fruits and seeds in spring, summer, and fall.

Plant them the coming spring in gardens. Some of the wild flowers are especially interesting.

While collecting seeds of certain plants, others will be in bloom. Pupils may take interest in collecting some of the flowers and pressing them, then mounting them.

INSECTS :

In the study of insects the rearing of silk worms as an introduction to insect life as a whole.

Preparation of insect cases showing life history of insects.

Watch the development in boxes, breeding cages, out in the yards and fields. Notice the flowers they visit.

(a) Insects that are beautiful.

(b) Those that are common and either useful or injurious.

Children often dig up plants to see how they grow, plant them over again, etc. They are equally interested in finding out about the butterflies that are beautiful, about the flies, fleas, ladybugs, and others.

THIRD YEAR.

PET ANIMALS :

The rabbit, squirrel, fowls, others.

Kept in cages at home or at school.

Comparison of habits, eating, drinking, etc.

Comparison of general structure, teeth, legs, covering, etc.

ANIMALS : At the parks.

ANIMALS :

Seen at the circus.

Children visit parks, go to the circus, make reports.

ANIMAL STORIES :

Stories of animals. Those the children are acquainted with. Those read of in books. Bear stories, hunting stories, all sorts of stories about wild animals of all kinds. Youth's Companion stories.

Note how general structure varies with habits of life. Specify examples. Make comparisons. Do not classify. Use Bulletin on Humane Education, San Diego State Normal School.

BIRDS : The life of a bird.

- (a) The bird's home; how he is fed; his first suit; how he changes his clothes; his first flight; his education. The bird's language; how he eats; where he sleeps; his travels; his family and friends, etc.
- (b) Common wild birds. Become acquainted with the common birds by out-of-door lessons. Recognize the birds by sight and by their song and tones.

Make lists of those about Los Angeles, giving descriptions by which they may be recognized. Make records of interesting facts learned.

Food they eat; trees they live in; nests they build; songs they sing; things they do.

Stories of birds. References: Our Feathered Friends, Grinnell; First Book of Birds, Miller; Stories of Our Western Birds, Grinnell; Birds of California, Wheelock.

INSECTS :

- (a) Ants. Life history and habits studied from a nest kept in the school-room and from observation in the yards and fields.

Most interesting stories about ants are abundant.

The ant at home. How ants manage a farm. How ants carry on war.

The ant as a carpenter.

- (b) All kinds of cocoons.

GARDENING :

Plant all sorts of garden seeds.

- (a) Those that the children know that are good to eat and have beautiful flowers.

- (b) Others which are unknown.

Let the scholars find out by planting what sort of a plant a seed will produce.

FLOWERS :

Competitive flower rearing.

Common flowers, wild and cultivated.

What becomes of the flowers?

What does the pollen do?

Why are the flowers so large and bright?

The story of the seeds, flower, and fruit, simply told and illustrated.

FRUIT :

Study some of the common fruits—the grape, apple, orange, others.

The seed, the plant, the vine of the tree; the flower, the fruit.

TREES :

Call attention to the most common ornamental trees in parks and yards of Los Angeles. What seeds, flowers, what fruits have these?

Describe the countries where they grow wild in forests.

Seed dispersal as in second grade.

SUN, MOON, AND STARS :

Simple facts about the sun, moon, stars, and planets.

Myths and stories.

FOURTH YEAR.**DOMESTIC ANIMALS :**

The horse, traits, use, care, stories.

Other animals which perform similar service to man.

The camel, donkey, burro, elephant, and others.

Structure and make-up of the animals upon which their usefulness depends.

How were they domesticated?

Wild animals (relatives).

References: Through Magic Glasses, Buckley; Youth's Companion (paper).
Use Bulletin on Humane Education, San Diego State Normal School.

BIRDS:

What do birds do in the world?

The problems which birds have to consider.

(1) Obtain food, (2) secure safety, (3) build homes, (4) care for their young.

(5) What are their tools? (6) Means of defense? (7) What instincts are exhibited? (8) Migration of birds.

In doing these things birds exhibit a host of interesting traits, perform invaluable service to man as well as do him some harm.

Here is a rich field in nature study.

For practical work have the children make reports of activities of birds in the yards and fields as far as they can.

Compare the doings of birds that work somewhat the same way, and again compare birds widely different in their doings of similar things.

For example: Nest building by the humming bird and ostrich.

In making comparisons suggested by headings 1, 2, 3, 4, 5, 6, 7, 8, a large amount of material for study is at the command of anyone who is familiar with the birds about Los Angeles.

Reference topics—Story form.

Tools and tasks among birds.

How a bird goes to bed.

How a bird travels and why.

Bird architecture.

References: Nature Study and Life, Hodge.

Nature Study, Jenkins and Kellogg.

The story of the birds, Baskett.

Handbook of Birds of Western United States, Bailey.

Stories of our Western Birds, Grinnell.

Birds of California, Wheelock.

Outlines in Nature Study and History, Engell.

INSECTS:

(a) The mosquito, care of eggs; larvæ, pupæ, molting; change to adult form.

The mosquito and disease.

What is being done to exterminate the mosquito.

(b) Insects of the household; flies, fleas, bedbugs, others.

Some wonderfully interesting things about these animals which everybody ought to know.

References: Nature Study, Jenkins and Kellogg.

Nature Study and Life, Hodge.

Natural History of Aquatic Insects, Miall.

PLANTS:

(a) The story of life and work of the plant simply told.

Simple experiments.

The use of roots, stem, leaves, and flowers.

The way plants use rain and sunshine, earth and air, to live and work.

(b) Plants as food makers.

The fruit, roots, and different parts of the plant as storehouses of food.

Illustration from familiar plants.

- (c) Study a flower in detail.
Competitive flower rearing.
Insects which visit flowers.
The common fruits and ornamental trees.
- (d) Further study of plants.

FIELD WORK:

The suggestions for Field Work, given in "California's Plants in Their Homes," are excellent.
Other references, third and fourth grades: Flowers and Their Friends, Morley; Pacific Nature Studies, Wagner; Glimpses of the Animate World, Johonnot.
Habits of California Plants, Chandler.
Outlines in Nature Study and History, Engell

DOMESTICATION OF ANIMALS:

Taming and feeding of common wild birds.
Practical work given in: Nature Study and Life, Hodge.
This field is full of interest from a practical as well as an educational standpoint.
Our birds are worth far more than their board and lodging, for their beauty and song, for their work in insect destruction, for the lessons of life that we learn from them. Use the Bulletin on Humane Education, San Diego State Normal School.

FIFTH YEAR.

INDUSTRIES OF ANIMALS. (Birds in grade 4.)

What do animals do in the world?
(1) Obtain food, (2) safety, (3) means of defense, (4) build homes, (5) care for their young, (6) instincts exhibited.
To this end: Ways and means; structure in relation to things done. A host of interesting things grow out of this subject as nature-study material for pupils, much of interest for teachers.
Select some animal (insect, mammal, mollusk) that all know and make it a study.
Having studied several, make comparisons as to 1, 2, 3, 4, 5, 6.
For example: The gold fish, frog, chicken, cat. Many others.
References: Nature Study and Life, Hodge.
Animal Industries, Houssay.
Romance of the Insect World, Badenoch, others.

INSECTS:

Spiders, collection and care of living spiders, in jars and in schoolrooms, spider webs, spider life in the world.
Injurious insects. Field work supplemented by stories.
Scale insects:
Cottony cushion scale.
Black scale.
Phylloxera, others.
The ladybug.
Spraying and poisons.
Shellac.
Cochineal.

Codling moth; silkworm moth, clothes moth, fruit-tree borers, others.
The silk industry, fruit industry, lumber industry.

FLOWERS AND INSECTS :

The pollination of flowers. Chapters 9, 10, 11, and 15 of "California Plants in Their Homes."

Special adaptation of flowers to insects.

Some early flowers. Chapter 7, "California Plants in Their Homes."

Some summer flowers. Chapter 9, "California Plants in Their Homes."

Plants with mechanical genius. Chapter 10, "California Plants in Their Homes."

Plants of high rank. Chapter 11, "California Plants in Their Homes."

Reasons why some plants succeed and grow most abundantly.

Why others fail and dwindle.

Plant societies; a water society; a rock society; others.

SUNSHINE: Where does the sunshine go?

Sunshine and the colors of objects all about us.

Sunshine and the work of the leaves of plants.

Sunshine and the taking of pictures.

Sunshine and the rain, the wind, the storm.

Sunshine and shadow.

Simple experiments.

COMBUSTION: Things that burn.

A candle.

Wood.

Gas.

Coal.

Oil.

Others.

Object lessons.

References: Nature Study and Life, Hodge.

Nature Study, Jenkins and Kellogg.

SIXTH YEAR.**ANIMALS :**

Of Los Angeles.

Of the Temperate Zones.

Of the Tropics.

Of the Polar Zones.

Of the sea.

Geographical description of animals, products of animal life and commerce. Effect of climate on the distribution of life, on the development of life.

Protective resemblance and mimicry.

Social communities among animals.

Correlate this work with geography.

References:

Animal Life, Jordan and Kellogg.

Physical Geography, Gilbert and Brigham.

Physical Geography, Redway.

State Series, Grammar School Geography, pages 28-32.

Humane Education, Bulletin on, San Diego State Normal School.

HONEY BEES :

Observation beehives kept in attic or suitable room of school building.

This work is intensely interesting to pupils.

Make record of the interesting things observed and learned about bees.

The honey bee and the fertilization of flowers.

Social life among insects. The honey industry.

Reference for practical work: Nature Study and Life, Hodge.

WASPS:

Homes, habits, means of defense, instincts.

References: The Solitary Wasp, Morley. Romance of the Insect World, Badenoch.

PLANTS:

Of Los Angeles.

COURSE IN AGRICULTURE.

Text—Agriculture for Schools of Pacific Slope. Hilgard and Osterhout.

SEVENTH YEAR.**B Class.**

Pages 1–105, Growth and Propagation of Plants.

A Class.

Pages 106–226, Improvement, Friends and Foes of Plants.

EIGHTH YEAR.

Text—Agriculture for Schools of Pacific Slope. Hilgard and Osterhout

B Class.

Pages 227–410, Diseases of Plants, Grains, Fruits, Vegetables, Forestry, Animals.

NOTE.—It is expected that in each class the teacher will introduce as far as possible simple experiments illustrative of the subject under consideration and encourage such experimentation by the pupils at their homes. Much opportunity should be given for class discussion, and occasional written descriptions required. By arousing a proper interest in this subject it can be made a valuable adjunct to the home life of the pupil and serve also to engender a proper appreciation of the value and dignity of agriculture, the basic science of life. The following books will be of great assistance: Plant Breeding, Bailey; Plant Breeding, de Vries; Lessons With Plants, Bailey; Insect Stories, Kellogg; Nature Study and Life, Hodge; First Book of Forestry, Roth; Primer of Forestry, Pinchot; Principal Household Insects of the United States, Superintendent of Documents, Washington, D. C.

GARDENA AGRICULTURAL HIGH SCHOOL.

An unusual step in progress has been made recently by the school board of Los Angeles in establishing an agricultural high school at Gardena, 12 miles from the city. Twenty acres of land have been purchased and a good course in secondary agriculture started. Mr. Clayton F. Palmer, formerly connected with the Los Angeles State Normal School has been placed in charge of the agricultural department.

Preparation of the soil was most difficult, blasting the hardpan, found a few feet below the surface, being necessary before planting. An irrigating plant has been installed by the students. Lath houses and houses screened with cotton have been built by them. Mush-

room beds have been planted, nurseries for fruit trees and grapevines started, and a good farm put under cultivation, all the work of the high school students. The personal ventures of the boys are interesting. Two boys whose future interests will be probably in orange growing, have built and bear the responsibility of a lath house for oranges. They are growing the seedlings at present and will bud them and set them out as time goes on. Another boy has a similar venture in onions, two others in chickens, and one in potatoes. The expense of each venture is borne by the owner, and a portion of the profits given to the school.

The classes have set out shrubbery and flower beds around the school. Each student has an individual plat, raising that in which he has the most interest. The high-school course in agriculture and related sciences is given below. Secondary education would have no place in a report on elementary education if it were not that Los Angeles is trying to solve the relation between the grades and the high school. It hopes to do this by reaching downward into the grades and taking control of the seventh and eighth grades. The agricultural high school will have the seventh and eighth grade classes in charge this year. The future of this experiment will be of vital interest to schools all over the country.

COURSES IN AGRICULTURE AND SCIENCE AT THE GARDENA AGRICULTURAL HIGH SCHOOL.

Farm economics and rural law.—This course will be offered to fourth year high-school students only, five times a week. The first part of the work will consist of a brief but concrete and practical consideration of (a) farm economics. Under this head are taken up such matters relating to production, distribution, and consumption as land values, rent, taxation, the application of the law of supply and demand to the production and marketing of produce, cooperative marketing and buying versus other methods, the farmer and the railroads, highways, location and climate, in their relation to production and distribution, the farmer and the community, etc. The text, which will serve as point of departure for the course, will be Blackman's *Economics for High Schools*. The work will be conducted by means of class discussions, recitations, debates, and reports.

(b) Rural law. An attempt will be made in this portion of the course to give the pupil some understanding of the laws of California relating to land titles, water rights, leasing, mechanic's and other liens, notes, mortgages, property rights, banking, carrier's liability, taxation, etc. Text to be selected.

The work in farm economics and that in rural law will not be sharply differentiated, but each will, to a large extent, supplement and illuminate the other.

References for the entire course: Bailey's *Encyclopedia of American Agriculture*; *Rural Wealth and Welfare*, by George T. Fairchild; *An Introduction to the Study of Agricultural Economics*, by Henry C. Taylor; *The State and the Farmer*, by L. H. Bailey; *Bulletins of the United States Government*.

NINTH YEAR.

General science.—The aim of the course is to give pupils an elementary knowledge of the fundamental sciences with special reference to agriculture. The latter is used as a natural point of departure, because it is the simplest and yet most complete embodiment of them all. It is intended that this course will help the student to find that line of work which he seems best fitted by temperament to pursue, if he is to take up a scientific course. Those who do not care for a scientific education will get no more of any of the sciences in this course than any intelligent person of this age needs merely to be a good citizen.

Text: Rowell's General Science Outlines.

TENTH YEAR.

Economic zoology.—This course includes a general view of animal life. Particular attention is given to those animals affecting the agriculturist. In the study of farm animals, attention is given to housing, feeds, breeds and breeding, diseases and remedies, as well as anatomy, physiology, and reproduction. A study of the habits, life history, and methods of breeding, and eradication of injurious insects, together with a consideration of the beneficial insects will constitute an important part of the course. Each student is required to make a collection of insects of the community.

Agricultural botany.—This subject includes a general survey of the field of botany, together with a special study of the agricultural phases of the subject. A school garden is maintained in connection with this study as in general science. A study of the morphology, physiology, and the classification of plants, and the compiling of a herbarium are important features of the work.

This subject is a prerequisite for horticulture.

Texts: Bergen, Essentials of Botany; Osterhout, Experiments with Plants.

Domestic chemistry.—This course takes up chemistry as applied to the home—cooking, fermentation, decomposition, dyeing, adulterations, etc.

Text: Vulte's Laboratory Notes in Household Chemistry.

ELEVENTH YEAR.

Poultry culture.—This course deals with types, breeds, and breeding of barn-yard fowls, incubators and brooders, buildings, feed and marketing, diseases and remedies.

Dairying.—This course deals with the problems concerned in the production of milk and its products. It considers the nature and composition of milk, milk testing, cheese and butter making, marketing milk and milk products, dairy bacteriology and sanitation.

Agricultural chemistry.—This subject is taught with special reference to agriculture. The composition of soils, plant foods, fermentation, decay, tests for starches and sugars, and effect of heat are among the important topics discussed.

Text: Brownlee and others, First Principles of Chemistry.

Horticulture and forestry.—This subject to be preceded by botany. It considers those operations necessary to the successful production of fruits, vegetables, and trees. The student is given ample practice in seed sowing, budding, grafting, pruning, spraying, etc. Plant diseases are given considerable attention with methods for their control. Each student is required to make a collection of plant diseases.

Text: Wickson's California Fruits.

Agricultural physics.—The purpose of this course is to acquaint the student with the fundamental physical laws governing the world and their relation to daily life, especially in the home and on the farm. Mechanics, heat, light, sound, electricity, and magnetism are the main subdivisions of the work.

Text: Milliken and Gale's First Course in Physics.

Landscape gardening and greenhouse work.—In this course emphasis is placed upon the production and best uses of ornamental plants of all sorts. Practice is given in the sowing of seeds in flats, potting plants, making cuttings of various ornamental forms, bulb culture, etc. The student will be given the opportunity of caring for lath house, cloth house, greenhouse, and cold frame, and plans will be made for the planting of grounds. Practice work upon our own grounds will be required of those taking this course. Botany must be taken as a prerequisite for this work.

Text: Bailey's Nursery Book.

Farm crops and management (A12).—This course includes a study of the relations, adaptability, uses, habits of growth, methods of cultivation, grading, and marketing of farm crops, seed selection, hybridizing, weed identification, farm management, elementary surveying, practical irrigation, etc.

Soils and fertilizers (B12).—Here the student will perform experiments with soils of various kinds, and work out fertilizer tests for various crops. Some of this work will be done in the new soil laboratory, and much of the application of what is learned will be carried out by means of field or pot experiments. Considerable attention will be given to questions concerning the maintenance of soil fertility, soil improvement, conservation of soil moisture, etc.

Special problems.—This work is offered in the last year for the purpose of giving the student the opportunity of working out some problem in plant or animal industry in which he is especially interested. In this work, which will be original research in spirit and nature, the student is to receive help from the instructor only in the way of supervision and suggestion. Such work should test the student's grasp of fundamental principles and teach independence.

PORTLAND, OREG.

The schools of Portland have taken no active part in the promotion of agriculture or horticulture. While the city is famous for its civic pride and some of the principals of schools encourage the children to assist parents in their home gardens, the matter of interesting children in plant life is left wholly to the parents or to the agencies.

A young men's association of Portland wields a strong influence among the men and boys of the city along many and varied lines. In 1910 the association offered to teach every boy in Portland to swim. Three thousand boys received such instruction. Equally as many responded to the call given by the association through the public schools, in 1911, to sign a contract to enter a garden contest in growing four vegetables and one flower at their homes. In the judgment of the director of the boy's work, Mr. J. W. Palmer, this is the best work ever done by the association in its efforts to reach the boys.

In this contest the plat cultivated could not be less than 10 by 15 feet. A registration fee of 40 cents was charged to cover postage, cost of seeds, and other expenses. The contest was divided into a spring contest and a fall one, a registration fee of 60 cents being charged if both were entered. Early in the spring a representative from the Oregon Agricultural Experiment Station, at Corvallis, gave a course of elementary talks to the boys. Seeds were distributed, to be planted after methods given in the lecture course. Each contestant was required to make a report on blanks furnished by the association on the 1st and 15th of each month. The reports had to reach the contest secretary within three days of the stipulated time or credit was not allowed on the score. These reports counted 30 points on the prize awards. They could be sent by mail or brought to the office by the boy, the latter way counting 10 additional points, as it was felt that personal delivery of the reports offered an opportunity for discussion with the director. Every garden was visited by the association secretaries and judged, this counting an additional 40 points. An exhibition was held at the end of each contest, no boy being allowed to compete for a prize unless he entered this exhibition. The following is a score of marking used in judging for the prizes:

Contestants will be marked on the following basis:

Neatness of reports, 10 points. Learn to be neat.

Promptness, 10 points. Get them in on time.

Completeness, 10 points. Be careful to have the report made out properly. Don't duplicate an entry of one period in the report of the next period.

Personal delivery, 10 points. Additional points will be earned by those who bring in their reports instead of mailing them.

Observations, 10 points.

Vegetable show, 10 points.

Inspections, 40 points.

No contestant will be considered for a prize who fails to have an exhibit at the vegetable show at the close of his section of the contest, no matter how high his standing otherwise.

SPOKANE, WASH.

More in the line of school gardening is being done in the eastern part of Washington than in the western. Spokane especially has some excellent work, though not as a recognized part of the course of study. The principal of a building, however, who recognizes its value in the growth of the child and in addition to her other duties finds time to have the children plant and cultivate a garden will find her efforts well commended by the superintendent of schools. By the use of water, marvelous lawns are grown in Spokane in an incredibly short time. Several very attractive clover lawns that had

been planted but six weeks were noted around school buildings. All the schools that have gardens use about the same area, 50 feet by 100 feet, and these are generally similar in plan—the individual plat for the child and an observation or educational section. A large potato yield at the Audubon School was to be sold for pictures for the school. This school, following the thought suggested by its name, has made and placed bird boxes in every available spot about the school—in the windows, on poles in the yard, and in near-by trees.

An excellent beginning has been made in Spokane, and when it sees the necessity of a trained teacher to direct the work it will hold a front rank in the best form of school garden, the one on the immediate school grounds, for the board of education is most far-sighted in its purchase of grounds for buildings. It never buys less than a block, 300 feet by 300 feet, and sometimes more. It buys in advance of the growth of population and has now four sites waiting to be built upon. With so much land buildings are properly located, additions can be made as needed, and plenty of space assigned for gardens and playgrounds.

Schools that deserve especial mention other than the Audubon are the Columbus School, in a semirural section, and the Cooper School. The remarkably green lawn of the former school was in striking contrast to the dried grasses of the prairie surrounding it. Two hundred and forty children are represented in the Cooper School garden.

As a part of the city school system, Spokane has established a parental school 4 miles from the city on a 45-acre tract of land. The site is perfectly suited to the purpose. Located in a rich valley on the banks of the Latah River, it affords opportunity for boating, swimming, skating, abundance of ice for cutting, and water in plenty for irrigating purposes. The school had been in operation but a little over a year and being under the direction of William M. Baker, a man who received his training at the Chicago Parental School, it is conducted similarly. It is organized on the family plan, with cottages built to accommodate 20 boys to each home. Each family is under the direction of a man and his wife, particularly selected for the place.

The cost of keeping boys in small families is considerable, but it is easily overbalanced by the greater good that can be done. As in Chicago, the classes are kept at the same standard as the city schools. In addition they have manual training, horticulture, laundry work, and military training. The boys have built wagon boxes, hot beds, root cellars, and flumes, and assisted in putting in the telephone and fire alarm system. They have 400 chickens and 200 ducks. They have raised all the vegetables used at the institution in a year except one sack of onions.

The equipment in the horticultural department consisted of three horses, harness, wagons, and the necessary tools for farm and garden. The vegetable garden is planted on the plat plan, each plat measuring 25 by 63 feet, each boy having one of these divisions as his own garden. Each garden is hoed and weeded by the boy assigned to it and the system of irrigation is so arranged that each boy can handle the water on his own plat (Pl. XI, fig. 1). Beets, peas, beans, parsnips, lettuce, radishes, onions, celery, cabbage, and potatoes are growing on each plat. About 8 acres have been planted to corn, potatoes, squash, pumpkins, tomatoes, cabbage, beans, and the regular root crops (Pl. XI, fig. 2). A fairly good-sized orchard has been set out and many of the small fruits. This farm life is of unquestioned benefit to boys from the city streets. They soon become healthy, vigorous, and bright-eyed under the outdoor treatment.

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FIG. 1.—BOYS OF PARENTAL SCHOOL, SPOKANE, WASH., IRRIGATING AND CULTIVATING SCHOOL GARDENS.



FIG. 2.—GATHERING CROPS IN GARDEN OF PARENTAL SCHOOL, SPOKANE, WASH.

